

Transportation 2030 Equity Analysis Report

November 2004

**Metropolitan Transportation Commission
101 Eighth Street
Oakland, CA 94607**

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General Counsel

EQUITY ANALYSIS REPORT STAFF

Doug Kimsey
Manager, Planning

Connie Soper,
Senior Transportation Planner

Therese Knudsen
Equity Analysis Project Manager

Chuck Purvis, Rachel Gossen
Travel Demand Forecasting

Rachel Gossen, Garlynn Woodsong
Maps and Figures

MINORITY CITIZENS ADVISORY COMMITTEE

Special acknowledgment to MTC's Minority Citizens Advisory Committee who contributed to the development of the Equity Analysis methodology, as well as to those who contributed to the Committee's Equity Analysis discussions.

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EXECUTIVE SUMMARY

Background

The Transportation 2030 Equity Analysis is one component adding to a host of MTC programs that focus on or address environmental justice. The intent of environmental justice is to 1) avoid, minimize, or mitigate disproportionately high and adverse effects on minority and low-income populations, and 2) ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

The purpose of the equity analysis is to measure both the benefits and burdens associated with the transportation investment packages proposed in the Transportation 2030 Plan, and to make sure that minority and low-income communities share equitably in the benefits without bearing a disproportionate share of the burdens.

This equity analysis builds on the analysis conducted for the 2001 Regional Transportation Plan, and responds to requests to include additional measures. In 2001, the analysis measured access and travel time to jobs. In addition to measuring access and travel time to jobs, this analysis assesses the following new measures:

- Access and travel time to essential destinations by auto and transit. Essential destinations include schools (elementary, middle schools, high schools, community colleges and universities), food stores, health services and social services (including banks and post offices). Results are compared across Transportation 2030 investment alternatives
- Travel-time and out-of-pocket savings associated with Transportation 2030 investment alternatives (user benefits)
- Vehicle miles traveled through minority and low-income neighborhoods. This measurement provides information on hours of travel, hours of delay and emissions associated with this traffic, and is assessed across Transportation 2030 investment alternatives

A comparison of the results of each of these measures is made between low-income and minority communities (“communities of concern”) and the remainder of the Bay Area.

MTC’s Minority Citizen’s Advisory Committee (MCAC) contributed to the development of the equity analysis methodology, and provided input on the definition of communities of concern, essential destinations, vehicle miles traveled and emissions.

After an initial assessment of the results, deeper analysis related to access and travel time to jobs and essential destinations was pursued. To observe the effects of the transportation investment alternatives on different density ranges in the Bay Area, urban and suburban/rural communities of concern were separated and compared to the remainder of urban and suburban communities in the Bay Area.

While several new measures are included in the analysis as noted, the analysis does not assess whether transit is serving residents *when they need to travel* and *exactly where they*

need to go, nor does it assess any cost barriers to using any mode of transportation. MTC and the Public Policy Institute of California (PPIC) collaborated on a study that examined travel patterns and transportation costs for low-income persons. Key findings of the final report for that study are highlighted in Chapter 2. MTC-sponsored community-based transportation plans also address these issues at the community level and are discussed later in this report.

Results of the Analysis

Access and Travel Time to Jobs and Essential Destinations

When looking at the aggregate level across the Transportation 2030 alternatives¹, communities of concern appear to share in the benefits of the transportation investments without bearing a disproportionate share of the burdens compared to the remainder of the Bay Area.

However, because 56% of communities of concern are located in urban areas where transportation networks are highly developed and a significant number of destinations are located, communities with urban and suburban densities were evaluated separately in order to determine whether benefits are distributed differently between urban and suburban communities of concern across the Transportation 2030 alternatives.

Key Findings

Access to jobs

- Across the Transportation 2030 alternatives, urban communities of concern have access to a greater number of jobs by transit than the remainder of urban communities. Both the Project and TRANSDEF alternatives offer access to a greater number of jobs overall than the No Project or Financially Constrained alternatives, which is likely due to the significant transit expansion included in these two alternatives.
- Access to jobs by auto is similar across the alternatives for both urban communities of concern and the remainder of urban communities. Access to the number of jobs by auto does not vary extensively across the alternatives compared to the base year for either urban communities of concern or the remainder of urban communities. One explanation may be that growth in population and employment projected for 2030 (land use changes) may be more pronounced relative to the investment in the road network over the same period.
- Results are similar for suburban communities of concern. Suburban communities of concern have access to a greater number of jobs by transit than the remainder of suburban communities. The Project alternative provides access to the greatest

¹ The Transportation 2030 alternatives assessed in the Equity Analysis include the No Project Alternative, the Financially Constrained Alternative, the Project Alternative and the Transportation Solutions Defense and Education Fund (TRANSDEF) Smart Growth Alternative. All alternatives are described in Section 4.2.

number of jobs by transit for suburban communities of concern, and is likely due to the investment in transit associated with this alternative as noted above.

- Access to jobs by auto is similar across the alternatives for both suburban communities of concern and the remainder of suburban communities.
- In general, the location of jobs held by low-income individuals is aligned with the location of communities of concern. Accessibility to low-income jobs within 30 minutes by transit is best from the downtown Oakland/Berkeley and downtown San Francisco communities of concern. A mismatch occurs along the I-680 and I-580 corridors in Contra Costa and Alameda counties where a significant number of low-income jobs are located but communities of concern are not. Similarly, low-income jobs are located along the Highway 101 corridor in Marin and Sonoma counties, which does not coincide with the location of communities of concern in this area.

Access to essential destinations

- Results for access and travel time to essential destinations for both urban and suburban communities of concern vary depending on which destination is examined. Generally, urban and suburban communities of concern have better access to destinations by transit across the Transportation 2030 alternatives than the remainder of the Bay Area as transit services are typically more concentrated in developed urban and suburban areas – where communities of concern are located – than in outlying areas².
- Urban and suburban communities of concern have access to a greater number of food stores, elementary schools and middle schools by auto and transit than the remainder of the Bay Area, as these destinations are more numerous in the higher density areas where communities of concern are also located. However, in most cases, urban and suburban communities of concern have access to fewer health services than does the remainder of the Bay Area communities.

Average Travel Time and Mode Split

- The remainder of Bay Area communities drives approximately 10% more for both work and non-work trips compared to communities of concern across Transportation 2030 alternatives. Conversely, residents of communities of concern take transit approximately 5%-7% more often for both work and non-work trips across all alternatives. One reason that may partially account for the higher use of transit in communities of concern could be the significant investment in the maintenance and expansion of public transit service in all the “build” alternatives of the Transportation 2030 Plan.

² Note that the models are unable to project future-year locations of essential destinations. Results reflect access and travel time to current-year destinations across the various transportation alternatives.

- Travel time for work trips for residents of communities are a few minutes shorter by auto and approximately ten minutes shorter by transit compared to the remainder of the Bay Area – a trend common across all alternatives. Walking trips to work are approximately 12 minutes shorter for residents of communities of concern than the remainder of the Bay Area. Average travel times for non-work trips for residents of communities of concern and the remainder of the Bay Area are very similar, varying by only a few minutes across all modes.

User Benefits

Key Findings

- Residents of communities of concern and the remainder of the Bay Area both benefit from building any of the Transportation 2030 alternatives than a “No Project” approach to transportation investment because, compared to the No Project approach, each yields an annual per capita dollar benefit per user. Residents of communities of concern benefit most from the TRANSDEF alternative, while the remainder of the Bay Area benefits most from both the Project and TRANSDEF alternative. This may be due to the assumptions associated with each alternative, such as the pricing concepts that reward transit use and discourage road use included in the more aggressive TRANSDEF alternative, which tend to benefit densely populated areas.

Vehicle Miles Traveled and Emissions

Key Findings

- On an aggregate level, more vehicle miles are traveled in the remainder of the Bay Area than in communities of concern across all alternatives because the remainder of the Bay Area represents a larger geographic area and therefore a larger portion of the highway and street network. Controlling for population, examining vehicle miles traveled on a *per capita* basis yields higher totals in communities of concern than in the remainder of the Bay Area by approximately 20% (12% higher in the TRANSDEF alternative). This is not unexpected given that communities of concern are generally in close proximity to denser concentrations of jobs and essential destinations (and their associated transportation infrastructure) compared to outlying areas.
- Emissions measured on a per capita basis are higher for all indicators across all alternatives for communities of concern compared to the remainder of the Bay Area because close proximity to jobs and essential destinations (developed areas vs. outlying suburban areas) brings higher traffic volumes and emissions as a result. The measurements are higher by approximately 11%-23% across the alternatives.
- However, except for particulate matter, emissions are significantly reduced for residents of communities of concern and the remainder of the Bay Area across all Transportation 2030 alternatives compared to the 2000 base year. This is due to projected advances in technology related to emission control that will affect all vehicles over the next 25 years.

Conclusions

Collectively these results indicate that, overall, communities of concern will share equitably in the benefits of the Transportation 2030 investment alternatives without bearing a disproportionate share of the burdens. Results related to access and travel time to jobs and essential destinations vary depending on whether communities of concern with urban or suburban densities are examined. Generally, residents of communities of concern benefit from accessibility to jobs and essential destinations because communities of concern are often located in the developed sections of urban and suburban areas where transit service levels are highest and many destinations are most concentrated. While emission levels may be higher in communities of concern compared to the remainder of the Bay Area, building any of the transportation alternatives yields lower emissions in communities of concern than if the No Project alternative is pursued. It should also be noted that the Bay Area has been classified as attaining the federal health-based standards for carbon monoxide, ozone and coarse particulate matter (PM₁₀) by the United States Environmental Protection Agency. The Bay Area is unclassified for fine particulate matter (PM_{2.5}) due to insufficient data, but preliminary data indicate that the Bay Area may be in attainment for this pollutant as well.

The results suggest that, across the Transportation 2030 alternatives, transit will serve communities of concern better than the remainder of the Bay Area. As mentioned above, the analysis does not measure or capture whether transit is serving residents *when they need to travel* or *where they specifically need to go*, nor does it assess any cost barriers to using any particular mode of transportation. This is why obtaining input from residents of communities of concern, particularly those without access to vehicles, is critical during planning stages at the local level, such as through MTC's community-based transportation plans or short-range transit planning through Bay Area transit operators.

When examining transportation investments from a regional perspective, which was the focus of this analysis, it is difficult to key in on the needs of individual communities of concern. However, the tables in the Appendices of this report contain detailed results for each of the communities of concern for all of the indicators examined in the analysis. These results may yield additional insight about the communities of concern, such as the number of essential destinations located in each community, and may be useful for community transportation, land use or development planning efforts taking place in these communities.

Next Steps

MTC will continue to focus attention on improving transportation options in communities of concern. The following directions will be pursued:

- Focus efforts on allocating the Lifeline Program's \$216 million on projects that improve transportation in communities of concern.
- Proceed with and complete remaining community-based transportation plans.

- Continue to develop land use and development policies that incorporate the transportation, housing and service needs of communities of concern through the Transportation for Livable Communities Program and through new initiatives such as the development of MTC's adopted transportation/land use platform.
- Continue to refine and improve upon the equity analysis methodology, and improve data collection on a region-wide basis, such as collecting demographic data on those who drive and those who take transit.
- Pursue strategies related to Lifeline Transportation and Access to Mobility as outlined in the Transportation 2030 Plan.
- Continue to work towards improving the Bay Area's air quality by working cooperatively with the Bay Area Air Quality Management District and the California Air Resources Board.

Chapter 1 : Introduction

1.1 Background on Environmental Justice

Environmental Justice is a broad and complex topic that applies to many fields, and evolved out of concerns related to civil rights and equal protection under the law. Federal legislation guides environmental justice policies and practices, including Title VI of the 1964 Civil Rights Act, the 1994 Executive Order on Environmental Justice, and in the case of transportation, the 1997 Department of Transportation Order on Environmental Justice.

The Federal Highway Administration and the Federal Transit Administration offer three principles that provide the foundation for environmental justice³:

- * To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- * To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- * To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

As the federally-designated metropolitan planning organization for the nine-county San Francisco Bay Area region, the Metropolitan Transportation Commission (MTC) has a responsibility to conduct an analysis that measures the distributional effects of transportation investments in the region related to its long-range transportation plan. The analysis must assess the *regional* benefits and burdens of the transportation system investments for different socio-economic groups. This “equity analysis” is just one component of MTC’s policies and programs that address the environmental justice principles noted above.

In addition to conducting the equity analysis, MTC addresses the transportation needs of minority and low-income populations in other ways. As part of the current update to the long-range Regional Transportation Plan (RTP) – Transportation 2030 – MTC dedicated \$216 million over the next 25 years to a regional Lifeline Transportation Program to improve services in low-income communities. Efforts to advance transportation improvements in low-income communities are intended to address transportation gaps identified in the 2001 RTP, which concluded with the Commission’s adoption of the Lifeline Transportation Network Report. The Lifeline Report identified both spatial and temporal transportation gaps in low-income communities that prevent the full access to jobs and services that people need, and recommended that solutions to these gaps be developed with input at the local level. As a result, MTC’s Community-based Transportation Planning Program was launched to work directly with communities to set priorities and evaluate options for filling local transportation gaps.

³ Source: <http://www.fhwa.dot.gov/environment/ej2000.htm> - Accessed November 2004.

The CBTP program and other MTC efforts that either include or focus on environmental justice communities are described in further detail in Chapter 2.

1.2 Purpose of Equity Analysis

As mentioned above, MTC is the federally-designated metropolitan planning organization for the nine-county San Francisco Bay Area region, and has a responsibility to conduct an analysis that measures the distributional effects of transportation investments in the region related to its long-range plan. Therefore, the purpose of the Transportation 2030 equity analysis is to measure both the benefits and burdens associated with the transportation investment packages proposed in the Transportation 2030 Plan, and to make sure that minority and low-income communities share equitably in the benefits of the transportation network without bearing a disproportionate share of the burdens.

There is no standard national policy or guidance on how an environmental justice assessment or equity analysis should be performed, especially for a long-range plan⁴. However, the U.S. Department of Transportation recognized the methodology used in MTC's 2001 equity analysis in their publication *Transportation and Environmental Justice, Effective Practices*. This equity analysis builds on the analysis conducted in 2001, and responds to requests to include additional measures and examine potential negative effects associated with the transportation investment alternatives proposed for the regional network. In 2001, the analysis measured access and travel time to jobs. In addition to measuring access and travel time to jobs, this analysis assesses the following **new** measures:

- Access and travel time to essential destinations by auto and transit. Essential destinations include schools (elementary, middle and high schools, community colleges and universities), food stores, health services and social services (including banks and post offices). Results are compared across Transportation 2030 investment alternatives.
- Travel-time and out-of-pocket savings associated with Transportation 2030 investment alternatives (user benefits)
- Vehicle miles traveled through minority and low-income neighborhoods. This measurement provides information on hours of travel, hours of delay and emissions associated with this traffic, and is assessed across Transportation 2030 investment alternatives.

A comparison of the results of each of these measurements is made between low-income and minority communities and the remainder of the Bay Area.

MTC's Minority Citizens Advisory Committee (MCAC) contributed to the development of the equity analysis methodology, and provided input on the definition of environmental justice communities, essential destinations, vehicle miles traveled and

⁴ Transportation Research Board, National Cooperative Highway Research Program Report 532. *Effective Methods for Environmental Justice*, September 2004.

emissions. The methodology used in the analysis is discussed in Chapters 3 and 4.

Chapter 2 : MTC Environmental Justice Efforts

To provide perspective on the range of MTC's efforts relating to environmental justice, this chapter highlights MTC-sponsored programs that include or focus on environmental justice communities and describes the channels through which MTC receives input from members of environmental justice communities. Each initiative is described below.

2.1 Low-Income Flexible Transportation (LIFT)

Transportation is considered a key support service in ensuring that welfare recipients and other low-income individuals are able to access work or training opportunities. MTC partnered with local transit and social services agencies to respond to the challenge of improving transportation services for residents of low-income communities by initiating the Low Income Flexible Transportation (LIFT) Program. To date, a total of 32 pilot projects totaling over \$20 million have been funded to provide a variety of unique, locally-based transportation services; together they demonstrate a collaborative approach to transportation planning and funding.

The LIFT Program began in 2000 with an initial infusion of \$5 million Congestion Mitigation and Air Quality funds, which were matched with social service or other transportation funds to create a \$10 million program of projects. The second round of funding added over \$11 million to supporting LIFT projects.

Among the types of projects funded through the LIFT program are children's transportation and shuttle programs, late-night and weekend bus service, auto loan and car-sharing programs, flexible van service, programs that assist with making transit trips and fare assistance programs.

A third call for LIFT projects was issued in September 2004 for \$2.6 million. Projects will be selected in December, and will be implemented early in 2005.

2.2 Community-based Transportation Planning (CBTP)

MTC's CBTP program evolved out of two reports completed for the 2001 Regional Transportation Plan – the Lifeline Transportation Network Report and the Environmental Justice Report (EJ). The Lifeline Report identified transit needs in low-income communities throughout the San Francisco Bay Area and recommended community-based transportation planning as a first step in addressing these transportation gaps.

Likewise, the EJ Report identified the need for MTC to support local planning efforts in low-income communities throughout the region as a way to involve minority and low-income residents in the transportation decision-making process.

Each community planning process is a collaborative effort that involves the participation of residents, community-based organizations providing services within low-income neighborhoods, local transit operators, county congestion management agencies and MTC. Planning efforts are supported in each of the nine Bay Area counties and focus on the most impoverished communities identified in the Lifeline/EJ reports.

The outcome of each planning process is a transportation plan that contains community-prioritized transportation needs, as well as solutions to address them. Solutions could include fixed-route transit service, or other transportation services such as shuttles, auto-oriented solutions or bicycle options. Recommendations outlined in the plans are forwarded to policy boards for consideration and subsequent incorporation into other planning, funding and implementation decisions.

Five community-based transportation plans were completed in 2004, concluding the pilot phase of the program. MTC will implement community-based transportation planning in the remaining sixteen communities identified in the CBTP program guidelines. The planning process for the next set of plans will begin in early 2005.

2.3 Transportation for Livable Communities

The purpose of the Transportation for Livable Communities (TLC) Capital and Planning Program is to support community-based transportation projects that bring new vibrancy to downtown areas, commercial cores, neighborhoods, and transit corridors, enhancing their amenities and ambiance and making them places where people want to live, work and visit. TLC provides funding for projects that are developed through an inclusive community planning effort, provide for a range of transportation choices, and support connectivity between transportation investments and land uses.

Projects submitted for the TLC program are evaluated on several factors, including whether a project serves a low-income community. In the most recent cycle of funding for TLC capital grants, ten of the eleven projects included on the proposed program of projects serve low-income or minority communities. Of the eight TLC planning grants awarded in the most recent funding cycle, six are located in low-income or minority communities.

2.4 Transportation Spending Study

The cost of transportation is often a significant barrier for low-income individuals in getting to school, work or other essential destinations. MTC and the Public Policy Institute of California (PPIC) collaborated to study travel patterns and transportation costs for low-income persons of employable age for work and training purposes. The report, *Transportation Spending by Low-Income California Households: Lessons for the San Francisco Bay Area* was published under the auspices of PPIC in July 2004, and identified the following key findings:

- Transportation is the third-largest budget item for low-income households in California's metropolitan areas.
- Low-income households allocate a slightly smaller proportion of household expenditures to transportation than do other households.
- Cost appears to be a barrier to vehicle ownership among low-income households in the Bay Area.
- Cost is unlikely to be a barrier to transit use for most low-income households but may be a barrier for some.

- Low-income commuters are less likely than other workers to drive alone and more likely to carpool, walk, or travel by bus.
- Low-income workers have somewhat shorter commute times than other workers.

2.5 The Minority Citizens Advisory Committee (MCAC)

One of MTC's three citizen advisory committees, MCAC ensures that the views and needs of minority communities are adequately reflected in MTC policies and programs. The committee, which has been in existence since 1975, includes representatives from the region's African American, Asian, Hispanic and Native American communities, as well as individuals who are from, or work with, low-income communities. MCAC focuses on environmental justice issues, including the equity analysis, and has recently begun developing a set of environmental justice principles that can be used to assess transportation policies and programs to ensure that the needs of environmental justice communities are considered and addressed as MTC policies and programs are developed.

2.6 Regional Welfare to Work Transportation Working Group

MTC facilitates a group of transportation and social service practitioners who meet every two months to discuss the transportation issues of the Bay Area's welfare-to-work and low-income populations. Bay Area transportation and social service providers participated in MTC-sponsored welfare-to-work planning efforts in each of the nine Bay Area counties. This work led to the creation of the Regional Welfare to Work Transportation Plan in 2001. As a result of these planning efforts, the Regional Welfare to Work Working Group was formed to continue the dialogue surrounding low-income transportation needs. In addition to discussing relevant topics related to low-income transportation, the group provides input into the development of MTC programs, such as Lifeline Transportation, the LIFT program, community-based transportation planning and the transportation spending study.

2.7 Public Involvement

MTC's public involvement staff works to involve low-income populations and communities of color that traditionally do not participate in MTC's planning and investment decisions. MTC conducted an extensive public involvement program to solicit input on the Transportation 2030 Plan. Phase One of the outreach process began in June 2003 with a Summit in San Francisco, and concluded in December 2003 when the Commission set the parameters for regional priorities and local investment decisions. MTC used five primary methods to engage the public in focused input and discussion to inform the Commission's Phase One decisions⁵:

- A day-long regional summit held in San Francisco and attended by more than 450 people from throughout the nine Bay Area counties;
- A telephone poll of 2,700 voters and 900 randomly-selected residents (both voters and non-voters), providing a representative sample of opinion;

⁵ Public Outreach and Involvement Program, Phase 1 Summary Report. Moore Iacofano Goltsman, Inc. January 2004

- 6 focus groups held around the region to allow more in-depth discussion on major choices and tradeoffs. The recruitment effort was aimed at bringing together groups that represented a mix of gender, ethnicity, age, income, owner/renter status, and transportation modes used to travel throughout the region;
- About 30 targeted workshops held with specific groups and organizations with interests in transportation issues, including 8 meetings held in low-income neighborhoods in cooperation with community-based organizations selected through a competitive process; and
- An interactive Web survey (Budget Challenge) taken by over 530 individuals that included a budget allocation exercise. The Budget Challenge was open to the public.

Phase Two of the outreach process involved county-led discussions that focused on local transportation investments, as well as additional regional discussions focused on addressing specific topics, such as identifying potential new funding and plan priorities to meet continuing transportation demands. Phase Three will focus on seeking commentary on the draft Plan's recommendations, and will lead to development of a final Plan slated for adoption in February 2005.

2.8 Transportation 2030 Equity Analysis

The equity analysis is also included under the broad environmental justice umbrella with a more specific focus than many of the projects and initiatives described in this chapter. It is technical in nature and utilizes computer models and forecasts to predict both the benefits and burdens associated with the transportation investment packages proposed in the Transportation 2030 Plan. Results are evaluated to assess whether minority and low-income communities share equitably in the benefits without bearing a disproportionate share of the burdens. The Transportation 2030 Equity Analysis methodology is described next in Chapters 3 and 4.

Chapter 3 : Defining Communities of Concern

The first step in the equity analysis is to identify the areas for which the potential impacts and benefits of future transportation investments will be evaluated – or “communities of concern.” To do this, an understanding of Bay Area demographics related to low-income and minority communities is helpful.

3.1 Demographics of the Bay Area

Census 2000 Data

Census 2000 data is used to characterize Bay Area households by various socio-demographic characteristics at the community of concern and county level. Two Census 2000 data sets are used: Summary File 3 (SF3) and the 5-percent Public Use Microdata Sample (PUMS). Approximately one in six households received the Census 2000 long-form questionnaire and are included in Summary File 3. Tables from SF3 are used to glean information on race/ethnicity, income, vehicle availability, and means of transportation to work for Bay Area communities. PUMS data is also derived from the Census 2000 long-form questionnaire and is used to stratify households in the nine Bay Area counties by income level and vehicle availability.

Bay Area Low-income Population

Based on 1990 and 2000 Census data, Table 1 below illustrates the Bay Area population by poverty level. Nearly 9% of the Bay Area is below 100% of the federal poverty level in each survey year⁶. To account for the high cost of living in the Bay Area, the poverty level was doubled to 200%. This percentage is consistent with several Bay Area organizations that use income to determine program eligibility such as the Bay Area Food Banks and the Women Infant and Children (WIC) program that use 185% of the federal poverty level as the benchmark to make eligibility determinations. Approximately 21% of Bay Area residents are below 200% of the federal poverty level in both 1990 and 2000. Note that while overall population increases, there is no significant percentage change in the *share* of the Bay Area population below either 100% or 200% of the poverty level between 1990 and 2000.

Table 1

Bay Area Population by Poverty Level, 1990-2000					
	< 100 % of Poverty Level		< 200 % of Poverty Level		
Year	Persons	Share	Persons	Share	Total Population*
1990	502,354	8.5%	1,236,998	21.0%	5,880,887
2000	573,333	8.6%	1,374,211	20.6%	6,661,540
% Change	14.1%	0.1%	11.1%	-0.4%	13.3%
* Total population is persons for whom poverty status is determined. This excludes: institutionalized persons; military group quarters; college dormitories; and unrelated individuals Source: Census 1990 – Summary File 3, Table P117; Census 2000 – Summary File 3, Table P88.					

⁶ Table B21 in Appendix B contains income levels associated with the federal poverty level.

Bay Area Population by Race/Ethnicity

Based on 1990 and 2000 Census data, Table 2 illustrates Bay Area population by race/ethnicity. While the race/ethnicity categories are not identical between the two Census years, to get a sense of population trends by race/ethnicity, a general comparison between the two years can be made. In 1990, 39% of the Bay Area population was non-white. In 2000, just over half, or 50.1%, of the Bay Area population was non-white, illustrating an increase of approximately 11% in the population of minority residents in the Bay Area over the ten-year period.

Table 2

1990 and 2000 Population by Race/Ethnicity						
Race/Ethnicity	1990 Population	Percent of Total		Race/Ethnicity	2000 Population	Percent of Total
White	3,672,533	61.0%		White	3,382,773	49.9%
Hispanic or Latino	899,243	14.9%		Hispanic or Latino	1,315,931	19.4%
Asian or Pacific Islander	892,309	14.8%		Asian	1,277,769	18.8%
Black or African American	518,574	8.6%		Black or African American	488,352	7.2%
American Indian or Alaska Native	31,347	0.5%		American Indian or Alaska Native	25,355	0.4%
Other race	9,571	0.2%		Native Hawaiian or Other Pacific Islander	32,861	0.5%
				Other race	17,283	0.3%
				Multi (two or more races)	243,429	3.6%
TOTAL	6,023,577	100.0%			6,783,760	100%
Source: Census 1990 – Summary File 3, Table P012; Census 2000 – Summary File 3, Table P7.						

Vehicle Availability

Table 3 illustrates statistics on the availability of vehicles per Bay Area household. Overall, 90% of Bay Area households have access to one or more vehicles. While nearly 87% of minority households have at least one vehicle (slightly less than the Bay Area total), only 73% of low-income households have at least one vehicle, making low-income households more dependent on other modes of transportation than higher-income households.

Table 3

Census 2000 Share of Households by Vehicle Availability		
	Zero Vehicles	One or More Vehicles
Minority Households*	13.2%	86.8%
Low-Income Households**	27.4%	72.6%
All Bay Area Households*	10.0%	90.0%
* Source: Census 2000 – Summary File 3, Tables H44 and HCT33I (also see Table B8, Appendix B) ** Households below 200% of the federal poverty level, Source: Census 2000 – PUMS 5% Sample Data (also see Table B10, Appendix B)		

3.2 Defining Communities of Concern

The next step in defining communities of concern involves a closer look at concentrations of Bay Area minority and low-income populations so that comparisons between communities of concern and the remainder of the Bay Area population can be made across the Transportation 2030 investment packages. By using Travel Analysis Zones (TAZs), further delineation is possible.

The travel forecast model divides the Bay Area into TAZs, which are small area neighborhoods or communities that serve as the smallest geographic basis for travel demand modeling. Given that 20% of the Bay Area population is below 200% of the poverty level as shown in Section 3.1, MTC proposed to include a TAZ as part of a community of concern if 30% or more of the households within that zone are below 200% of the poverty level⁷. Using this threshold places an emphasis on evaluating areas with significant concentrations of low-income households. Likewise, given that 50% of the Bay Area is non-white, a TAZ would also be included as a community of concern if 70% or more of the persons in the households are of the following descent: African American, Asian American, Hispanic or Latino, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, or Multi-Racial (two or more races). These 30% and 70% thresholds were also used to define a community of concern in the 2001 equity analysis. Upon the request of MCAC, MTC considered an alternative scenario for communities of concern as well – one in which zones with 20% or more of the households are below twice the poverty level and 50% or more are minority households. This scenario captures more of the Bay Area population than the one using 30%/70% thresholds.

After discussing both scenarios, MCAC recommended that the equity analysis proceed using the scenario in which 30% or more of the population in a TAZ is below twice the

⁷ As noted in Section 3.1, 200% of the federal poverty level was used as the poverty benchmark to account for the high cost of living in the San Francisco Bay Area, and is consistent with the benchmark used for income eligibility determinations for means-driven programs in the region.

poverty level and 70% or more are people of color. While the 20%/50% scenario would include more Bay Area residents than the 30%/70% scenario, the advantage of using the 30%/70% scenario is that there is a greater comparison when looking at the remainder of the Bay Area population. It also focuses on communities with higher concentrations of poverty and minority status. The committee suggested that it would be more difficult to focus in on those communities that were truly of concern if the 20%/50% thresholds were used, as that scenario represents almost 60% of the Bay Area population. The 30%/70% thresholds represent 33% of the Bay Area population. The following maps illustrate both scenarios.

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After applying the 30%/70% thresholds to 2000 Census data and aggregating the TAZs to distinct communities, there are forty-four communities of concern. The communities are listed in Table 4, along with minority and low-income shares for each community.

County	Community of Concern	Minority	Non-Minority	Low Income	Not Low Income
1 SF	Downtown / Chinatown / North Beach / Treasure Isl.	68.5%	31.5%	43.6%	56.4%
2 SF	Tenderloin / Civic Center	59.9%	40.1%	53.5%	46.5%
3 SF	South of Market	65.1%	34.9%	53.2%	46.8%
4 SF	Western Addition / Haight-Fillmore	54.0%	46.0%	38.3%	61.7%
5 SF	Inner Mission / Potrero Hill	72.2%	27.8%	40.9%	59.1%
6 SF	Bayview / Hunters Point / Bayshore	90.7%	9.3%	33.9%	66.1%
7 SF	Outer Mission / Crocker-Amazon / OceanView	80.9%	19.1%	26.5%	73.5%
8 SM	Daly City	84.0%	16.0%	16.7%	83.3%
9 SM	South San Francisco / San Bruno	78.7%	21.3%	28.7%	71.3%
10 SM	North San Mateo	87.8%	12.2%	42.7%	57.3%
11 SM	East Palo Alto / North Fair Oaks	85.6%	14.4%	40.7%	59.3%
12 SC	Stanford / Mountain View	58.3%	41.7%	41.4%	58.6%
13 SC	Alviso / Shoreline / Sunnyvale	75.2%	24.8%	19.9%	80.1%
14 SC	East Santa Clara*	56.7%	43.3%	29.1%	70.9%
15 SC	Central San Jose	83.3%	16.7%	28.7%	71.3%
16 SC	South San Jose / Morgan Hill*	53.9%	46.1%	29.6%	70.4%
17 SC	East Gilroy	78.2%	21.8%	42.5%	57.5%
18 SC	Central and East Milpitas	77.9%	22.1%	14.0%	86.0%
19 Ala	Central Newark / Parts of Fremont	74.9%	25.1%	15.3%	84.7%
20 Ala	Northwest Hayward / Union City	79.3%	20.7%	25.2%	74.8%
21 Ala	Ashland / Cherryland / San Leandro	70.3%	29.7%	30.1%	69.9%
22 Ala	Fruitvale / East Oakland	91.8%	8.2%	48.6%	51.4%
23 Ala	West / North Oakland	83.5%	16.5%	52.1%	47.9%
24 Ala	Central and East Alameda	67.3%	32.7%	35.8%	64.2%
25 Ala	Berkeley / Albany	57.3%	42.7%	46.0%	54.0%
26 CC	South Richmond	87.7%	12.3%	47.5%	52.5%
27 CC	San Pablo / North Richmond	85.2%	14.8%	42.1%	57.9%
28 CC	Hercules / Rodeo / Crockett*	68.9%	31.1%	14.6%	85.4%
29 CC	North Martinez	40.8%	59.2%	38.4%	61.6%
30 CC	Central Concord	68.5%	31.5%	45.2%	54.8%
31 CC	Baypoint / Pittsburg / Antioch	68.1%	31.9%	38.2%	61.8%
32 CC	East Brentwood	56.2%	43.8%	30.5%	69.5%
33 Sol	North and East Vallejo	75.2%	24.8%	32.1%	67.9%
34 Sol	Central and East Fairfield	57.5%	42.5%	41.7%	58.3%
35 Sol	North Vacaville	44.4%	55.6%	30.5%	69.5%
36 Sol	Dixon	51.6%	48.4%	32.9%	67.1%
37 Nap	Napa / American Canyon	43.6%	56.4%	35.8%	64.2%
38 Nap	Calistoga	43.9%	56.1%	32.7%	67.3%
39 Son	Central Sonoma Valley	44.9%	55.1%	36.1%	63.9%
40 Son	South-Central Santa Rosa	51.2%	48.8%	39.9%	60.1%
41 Son	Southwest Healdsburg	48.4%	51.6%	40.7%	59.3%
42 Son	Guerneville / Monte Rio	17.2%	82.8%	35.7%	64.3%
43 Mar	San Rafael Canal District	83.9%	16.1%	58.7%	41.3%
44 Mar	Marin City	67.5%	32.5%	37.7%	62.3%
Communities of Concern		76.9%	23.1%	34.5%	65.5%
Remainder of Bay Area Communities		36.8%	63.2%	13.8%	86.2%
Bay Area Total		50.1%	49.9%	20.6%	79.4%

Source: Census 2000 – Summary File 3, Tables P7 and P88.
 * These communities do not appear to meet the 30/70 threshold; see Appendix A for explanation.

Community of Concern Population Densities

Reviewing the list of communities of concern in Table 4, it is clear that many are located in densely populated urban areas of the region. Using the population densities found in Table 5 below, 56% of communities of concern are categorized as Urban, 39% are Suburban and 5% are in the Rural category. Figure 1 illustrates this distribution graphically. The community of concern population density distribution contrasts with the population density distribution of the remainder of the Bay Area, which is shown in Figure 2.

Table 5
Population Density Categories

Population Density Category	Population Density Range (persons per square mile)	Total Land Area (square miles)	Share of Regional Land Area
Urban	>10,000	151.0	2.2%
Suburban	500 to 10,000	1,202.2	17.4%
Rural	<500	5,569.5	80.5%
TOTAL		6,922.7	100.0%

Source: Metropolitan Transportation Commission. *Census 2000: San Francisco Bay Area Race & Ethnicity Profiles – Data Summary #1*. Metropolitan Transportation Commission, Oakland, California, October 2001, p.15.

Figure 1 – Population Density Distribution (persons per square mile)

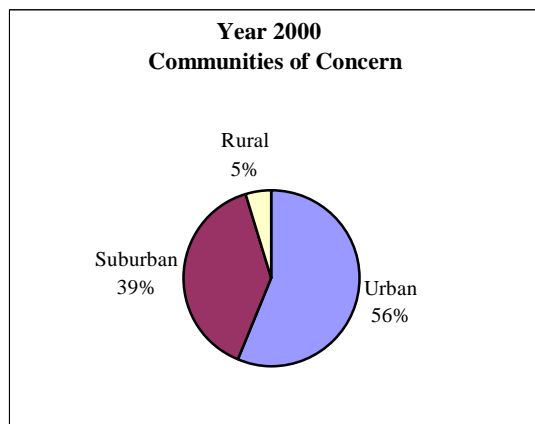
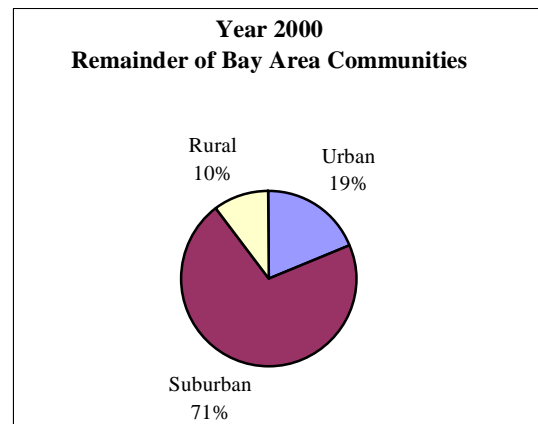


Figure 2 – Population Density Distribution (persons per square mile)



Essential Destinations

In addition to measuring access to jobs, the need to measure access and travel time to other essential destinations was raised during initial discussions on the equity analysis methodology based on concerns that fewer services are often located in communities of concern than other areas. MCAC recommended including the following essential destinations in the analysis: food stores, health services, social services, elementary and

middle schools, high schools, community colleges and universities, post offices, banks and credit unions⁸.

Essential Destinations Data

To conduct the essential destinations portion of the equity analysis, data was acquired from infoUSA on essential destination locations throughout the Bay Area. InfoUSA provides information on businesses including company name, street address, and the number of employees per establishment; the data is classified by Standard Industrial Classification Codes, or SIC Codes. At the most detailed level, SIC Codes are six-digit numbers used to describe each establishment.

The infoUSA data is current as of the summer of 2004 when the data was purchased. As with any database of this sort, errors are to be expected given the continuous fluctuation of businesses entering and exiting the economy. InfoUSA maintains that their lists are 92%-95% accurate on average.

Distribution of Essential Destinations within Communities of Concern

Table 6 illustrates the distribution of essential destinations in communities of concern, as well as for the remainder of the Bay Area. One column totals the number of establishments, a second column provides the number of establishments per 1,000 residents and a third column provides a sense of the quality of service that one might receive in the establishments based on the number of employees per 1,000 residents.

Based on current year data, the total number of essential destinations located in the remainder of the Bay Area is higher than in communities of concern across all categories. However, per capita, there is not much difference in the number of establishments between communities of concern and the remainder of the Bay Area except in the health services category – there are 3.2 health service establishments per 1,000 residents in the remainder of the Bay Area compared to 2.4 in communities of concern. By contrast, the ratio of food stores per capita is higher in communities of concern - 0.7 in communities of concern versus 0.4 in the remainder of Bay Area communities.

In terms of quality of service, most of the essential destination categories show that there are more employees per 1,000 residents working in establishments in the remainder of Bay Area communities than in communities of concern, the exceptions being colleges and universities, post offices and banks and credit unions.

Tables B13-B20 in Appendix B provide data on the number of essential destinations, destinations per 1,000 residents and employees per 1,000 residents for each of the 44 communities of concern.

⁸ MCAC advised to combine banks, credit unions and post offices with social services.

Table 6. Distribution of Essential Destinations, 2004

	Communities of Concern			Remainder of Bay Area Communities		
	Number of Establishments	Establishments per 1,000 Residents	Employees per 1,000 Residents	Number of Establishments	Establishments per 1,000 Residents	Employees per 1,000 Residents
Food Stores	1,608	0.7	7.17	1,882	0.4	9.00
Health Services	5,852	2.4	34.63	15,233	3.2	41.75
Social Services	3,332	1.4	15.52	6,593	1.4	13.25
Elem. & Middle Schools	546	0.23	9.97	1,244	0.26	10.95
High Schools	88	0.04	2.79	227	0.05	3.83
Colleges & Universities	116	0.05	9.89	159	0.03	6.75
Post Offices	124	0.05	2.03	230	0.05	1.57
Banks & Credit Unions	869	0.36	3.94	1486	0.31	3.57

Chapter 4 : Modeling and Forecasting Methodology

As mentioned in Chapter 1, the purpose of this equity analysis is to measure both the benefits and burdens associated with the transportation investment packages proposed in the Transportation 2030 Plan, and to make sure that minority and low-income communities share in the benefits of these investments without bearing a disproportionate share of the burdens.

Reviewing the methodology noted on page 1-2, this equity analysis measures

- Access and travel time to jobs and essential destinations, including schools (elementary, middle and high schools, community colleges and universities), food stores, health services, social services, post offices and banks and credit unions. Results will show access and travel time to these destinations for each of the Transportation 2030 alternatives.
- User benefits – Travel-time savings associated with Transportation 2030 alternatives is converted into out-of-pocket savings; results will show the savings associated with each of the alternatives compared to a No Project scenario.
- Vehicle miles traveled (VMT) through communities of concern. This measurement provides information on hours of travel, hours of delay and emissions associated with each of the alternatives.

Four Transportation 2030 investment alternatives are modeled and processed through MTC's forecasting system, including a "no-project" scenario; all alternatives are described in Section 4.2. Additional detail about the methodology is found in Appendix A.

4.1 Data Sources

Two data sources were used to perform the modeling analysis indicated above: ABAG's Projections 2003 and MTC's forecasting system. Each data set and its uses for this analysis are outlined below.

ABAG Projections 2003⁹

Every two years, the Association of Bay Area Governments (ABAG) produces a set of forecasts to estimate economic and demographic growth in the Bay Area. These forecasts are known as the Projections series. In this report, Projections 2003 is used to provide descriptions of the Bay Area and, in particular, the 44 Communities of Concern based on year 2000 data and year 2030 estimates for total population, total employment, mean household income, and low-income households.

MTC Forecasts

MTC uses travel modeling and forecasting to reflect base-year travel patterns and to simulate future year travel in the Bay Area. Results of MTC forecasts are used for

⁹ Source: Association of Bay Area Governments. *ABAG Data Center*. <http://data.abag.ca.gov/p2003/>. Accessed November 8, 2004.

several parts of this analysis. First, auto ownership estimates are used to characterize households in the 44 Communities of Concern as zero-, single-, or multi-vehicle households. Additionally, the auto ownership estimates are used to determine the average number of vehicles per household for each community. Second, indicator variables are extracted from MTC's forecasting system to assess the accessibility of Bay Area communities to jobs, essential destinations, and low-income jobs. The forecasting system is also used to calculate average and aggregate travel times, mode splits, user benefits, and to extract vehicle travel and emissions data.

4.2 Transportation 2030 Alternatives

The four Transportation 2030 alternatives included in the equity analysis are described below. The alternatives are established pursuant to the California Environmental Quality Act (CEQA) and are fully evaluated in the Draft Environmental Impact Report (EIR), a supplemental document to the draft Transportation 2030 Plan. The EIR evaluates five different alternatives to the proposed Transportation 2030 Project. Two alternatives considered in the EIR – the Financially Constrained Plus Sales Tax Alternative and the Financially Constrained Plus High-Occupancy Toll (HOT) Network Alternative – are not included in the equity analysis. The Project Alternative described below includes projects in both the Financially Constrained Plus Sales Tax Alternative and the Financially Constrained Plus HOT Network Alternative, and therefore serves as a proxy for these two alternatives. The Financially Constrained Alternative that *is* included in the analysis described below is a more conservative approach to investment than the other two financially constrained options.

Additional detail about the alternatives described below is found in the Draft EIR, Section 3.1.

No Project Alternative

The No Project alternative, required by CEQA, addresses the effects of not implementing the Transportation 2030 Plan. This alternative includes a set of highway, transit, local roadway, bicycle, and pedestrian projects that are in advanced planning stages and slated to go forward since they already have full funding commitments. These projects are: (1) included in the federally required Transportation Improvement Program (TIP), a three-year funding program of Bay Area project and programs, (2) not yet in the TIP but are fully funded county transportation sales tax projects authorized by voters in Alameda, Contra Costa, Santa Clara, San Mateo, and San Francisco counties¹⁰, and (3) not yet in the TIP but fully funded through the Regional Measure 2 Toll Bridge Program that was approved by Bay Area voters in March 2003.

Financially Constrained Alternative

This Financially Constrained alternative consists of only the set of transportation projects and programs that would be funded through revenues projected to be reasonably available over the 25-year horizon of the Transportation 2030 Plan. It does not include projects identified in the vision element of the Transportation 2030 Plan. The key financial assumption governing the financially constrained element of the Plan is that existing

¹⁰ Following the November 2004 elections, new sales tax measures passed in Marin and Sonoma counties.

sources of federal, state, or regional revenues are assumed to continue to 2030 with the exception of county transportation sales tax measures which, by law, must sunset. No new revenue sources that would require voter or legislative approval are assumed. This alternative is based on the Commission's regional priorities (i.e., addressing the maintenance and rehabilitation needs for local streets and roads and transit, continuing implementation of regional operations and customer service programs, funding clean air programs, and continuing the Transportation for Livable Communities (TLC) and Housing Incentive Program (HIP) programs, etc.). In addition, county level priorities developed by the individual county Congestion Management Agencies (CMAs) in consultation with their local agencies and transit operators are also included. The county priorities have been reviewed with the public and adopted by the CMAs' governing boards.

The Project Alternative

The Proposed Project, Transportation 2030 Plan, is a long-range, strategic investment plan to improve system performance for Bay Area travelers. Transportation 2030 is comprised of both a financially constrained element that MTC calls the "down payment," which directs anticipated funding to core transportation investments, as well as a comprehensive, action-driven course to fulfill our "vision" of a transportation system that performs better for all Bay Area travelers. Key investments would focus on system maintenance, operations and strategic expansion. Projects range from basic system maintenance, to management programs focused on improving system efficiency, and to major expansions of transit and roads. The vision element includes \$16.3 billion in additional new revenues as follows: county sales taxes, high-occupancy tolls, regional gas fees, vehicle registration fees, a BART property tax, a high-speed rail bond, a Sonoma/Marin Area Rapid Transit district tax, and an AC Transit parcel tax. Projects identified in the vision element of the Transportation 2030 Plan include (1) transportation sales tax projects included in proposed sales tax measures in Marin, Sonoma, Solano, Contra Costa, and San Mateo counties¹¹; (2) proposed completion of the High-Occupancy Vehicle (HOV) network in the region and its conversion into a High-Occupancy Toll (HOT) network; and (3) regionally significant transit and road rehabilitation shortfalls as well as system efficiency and capacity improvements needed to keep pace with the region's growth.

Transportation Solutions Defense and Education Fund (TRANSDEF) Smart Growth Alternative

This alternative is supplied by TRANSDEF, a transportation advocacy organization, according to the Settlement Agreement and Release entered into by TRANSDEF, Citizens for Better Environment (CBE), Bay Area Air Quality Management District, and MTC in March 2004. This alternative includes a different set of land use assumptions for the region than in the other alternatives, by directing more future residential development in the Bay Area into transit supportive corridors, thus enhancing opportunities to use transit, bike and walk to various destinations. The alternative also includes new transportation pricing concepts affecting transit and road users, and aimed at encouraging

¹¹ Following the November 2004 elections, either new or reauthorized sales tax measures passed in Marin, Sonoma, Contra Costa and San Mateo counties. The Solano County sales tax measure did not pass.

travel on the region's bus and rail transit systems. The alternative minimizes expansion of the highway system while adding a broader network of Bus Rapid Transit (BRT) routes, expanding rail with equipment that uses conventional gauge rail tracks, and assuming implementation of a High Speed Rail network between Northern and Southern California via the Altamont Pass. Its purpose is to test the effectiveness of a planning strategy of accommodating regional growth by maximizing new residents' use of transportation modes other than single-occupant auto by limiting roadway capacity expansion and directing more potential growth into infill and transit-supportive areas in certain counties, avoiding greenfield development in other counties, and implementing pricing strategies to make driving more expensive and transit more attractive.

The underlying land use assumptions for the Proposed Project and all the financially constrained alternatives are ABAG's *Projections 2003*, which represent the outcome of the Bay Area region's recent regional smart growth planning project (called "Smart Growth Project"). These projections assume that the Bay Area will provide more housing opportunities near transit and also accommodate a larger share of future Bay Area workers within the nine Bay Area counties. In contrast, the TRANSDEF Smart Growth alternative uses its own set of land use assumptions patterned after the Network of Neighborhoods alternative, one of three conceptual land use patterns initially considered in the Smart Growth Project. This alternative has the same number of residents and employees in the Bay Area as *Projections 2003*, but reduces the total residential land uses in outlying rural and suburban areas while increasing residential construction in the urban core. In addition, TRANSDEF increases the net residential densities (i.e., number of households per residential acre) compared to *Projections 2003*. This type of development pattern would result in more conversion of existing low-intensity uses along arterial streets into mixed use commercial and housing as well as greater production of housing types such as apartments, condominiums and townhouses.

Whereas the other alternatives assume that existing transportation costs will remain the same, TRANSDEF proposes several pricing strategies to discourage travel in single occupant autos while increasing the attractiveness of using transit, biking, or walking: 1) a \$2.00/day parking charge at several high-demand BART stations, 2) a \$5.00/day parking charge at all employment sites (this charge is used as a surrogate for an employer provided parking-cash out program whereby employees would receive cash or free transit passes in an amount equivalent to what an employer would normally spend on employee parking), and 3) a 20 percent reduction in transit fares (this fare reduction is used as a surrogate for a residential Ecopass system for new residential developments whereby residents would pay for monthly transit passes through their rent or condominium fees). The alternative also would institute a region-wide free transfer policy for riders using multiple transit systems. In addition, widespread ramp metering is assumed in this alternative.

The TRANSDEF Smart Growth alternative also includes a markedly different set of transportation projects and programs than the other alternatives, and does not assume that fully funded projects will be implemented if they are not currently under contract. A total of 261 projects from the Financially Constrained Plus Sales Tax alternative were not

included in this alternative, many of which are roadway projects. Roadway projects that were eliminated range from major interchange improvements such as the I-80/I-680/I-780 interchange improvements in Solano County; highway widenings such as Caldecott Tunnel fourth bore and Route 4 widening to 8 lanes with HOV lanes from Loveridge Road to Somersville Road in eastern Contra Costa County; and HOV projects such as the I-680 northbound HOV lane from Route 237 to Stoneridge Drive in Alameda County. In addition, BART extensions to Warm Springs and San Jose/Santa Clara were not included; and new transit services such as a TRANSDEF-defined region-wide Bus Rapid Transit (BRT) system, Diesel Multiple Unit (DMU) trains on conventional rail tracks, and upgraded Caltrain network (including electrification) were added. This alternative also assumes voter approval of a High Speed Rail system over the Altamont Pass serving San Francisco, Millbrae, Redwood City, Newark, Fremont, San Jose, Milpitas, and Livermore.

Chapter 5 : Results of Modeling Analysis

The results of the modeling can be evaluated in two ways. First, a comparison can be made among all of the Transportation 2030 alternatives, looking to see which alternative provides the greatest benefit to communities of concern and the remainder of the Bay Area. Second, comparisons can be made between communities of concern and the remainder of the Bay Area to see whether communities of concern share equitably in the benefits associated with each of the alternatives without bearing a disproportionate share of the burdens. Each measurement below focuses on the second comparison, pointing out differences in the proposed alternatives between communities of concern and the remainder of the Bay Area.

The Appendices contain detailed tables that support the text in the document. The body of the report focuses on how the modeling results affect communities of concern compared to the remainder of the Bay Area. Since communities of concern are comprised of a combination of low-income and minority households, tables in the appendices break out the following comparisons for each measurement – low-income communities (communities of concern definition) to not low-income communities, and minority communities to non-minority communities.

Detailed results for each of the measurements for all 44 communities of concern are also found in the Appendices¹².

5.1 Access and Travel Time to Jobs

This evaluation factor measures the number of jobs¹³ accessible by auto and transit for each of the alternatives for both communities of concern and the remainder of the Bay Area. The analysis measured jobs accessible by both modes within 15, 30 and 45 minutes. The forecasts include both regional population projections for 2030, as well as job growth projected for 2030.

Results

The results indicate that overall, communities of concern have access to a greater number of jobs than the remainder of the Bay Area across all Transportation 2030 alternatives for both modes. One explanation for these results is that a majority of communities of concern (56%) are located in urban areas where both transit and road networks are often more developed, and major job centers are often more concentrated than in the suburbs. Therefore, to control for varying densities, a second step was taken in the analysis. Communities of concern with urban densities were separated from communities of

¹² The low-income/not low-income and minority/non-minority breakouts are not available for vehicle miles traveled, vehicle hours of delay and emissions, but detailed analysis is included for these indicators for each of the 44 communities of concern. Low-income/not low-income and minority/non-minority breakouts are shown for average and aggregate travel time but detailed results for these indicators are not available for the 44 communities of concern.

¹³ While jobs are associated with work opportunities, they also represent locations of goods and services, such as hospitals, retail outlets, government centers, etc.

concern with suburban/rural¹⁴ densities. When urban/suburban communities of concern were compared to the remainder of urban and suburban communities, different results were revealed, as explained below.

Communities with Urban Densities

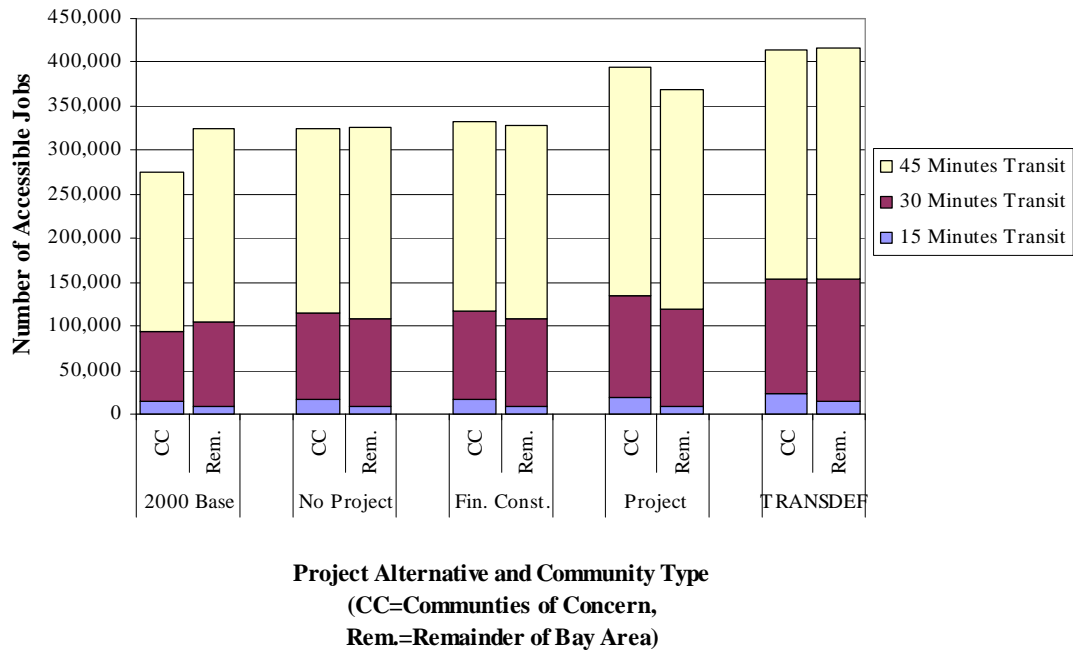
Overall, urban communities of concern have access to a greater number of jobs *by transit* than the remainder of urban communities in the Bay Area. They have considerably greater access to jobs within 15 minutes by transit – 16,000 – 23,000 - than the remainder of urban communities (9,000 – 15,000) across the alternatives (See Table B.8 in Appendix B for exact numbers of jobs, and Figure 3 for a graphic illustration). The Project and TRANSDEF alternatives provide access to the greatest number of jobs by transit for urban communities of concern, which may be due to the significant expansion of transit proposed under these two alternatives.

Access to jobs *by auto* is similar across the alternatives for both urban communities of concern and the remainder of urban communities. However, it is interesting to note that access to the number of jobs does not vary extensively across the alternatives compared to the base year for either urban communities of concern or the remainder of urban communities. One explanation may be that growth in population and employment projected for 2030 (land use changes) may be more pronounced relative to the investment in the road network over the same period. Additionally, because the number of jobs accessible by auto is so large (from 200,000 within 15 minutes to over 1.2 million within 45 minutes), incremental changes are not readily apparent.

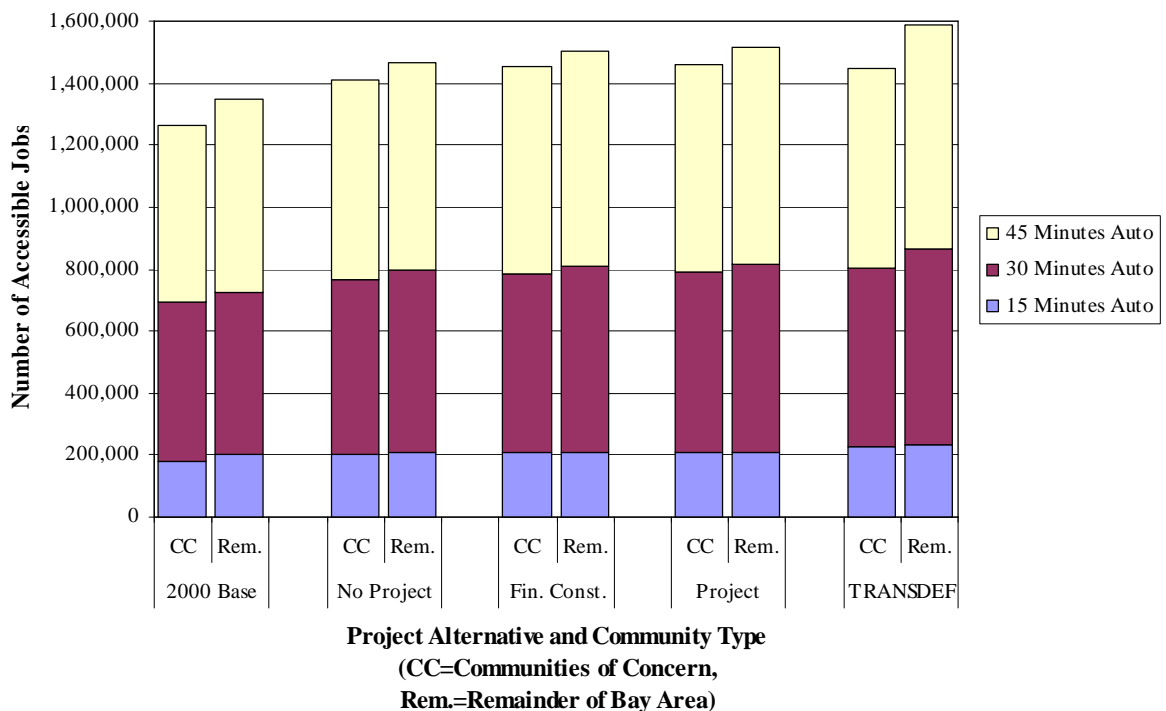
Figure 3 illustrates job access *by transit* for communities of concern with urban densities and the remainder of Bay Area communities with urban densities. Figure 4 depicts job access *by auto* for communities of concern with urban densities and the remainder of Bay Area communities with urban densities.

¹⁴ Rural communities of concern make up 5% of all communities of concern. Rural communities of concern were condensed into the Suburban category because the sample size was too small on its own to yield statistically significant results.

**Figure 3 TRANSIT Access to Jobs in Communities
with URBAN Densities
by Project Alternative and Community Type**



**Figure 4 AUTO Access to Jobs in Communities with URBAN Densities
by Project Alternative and Community Type**



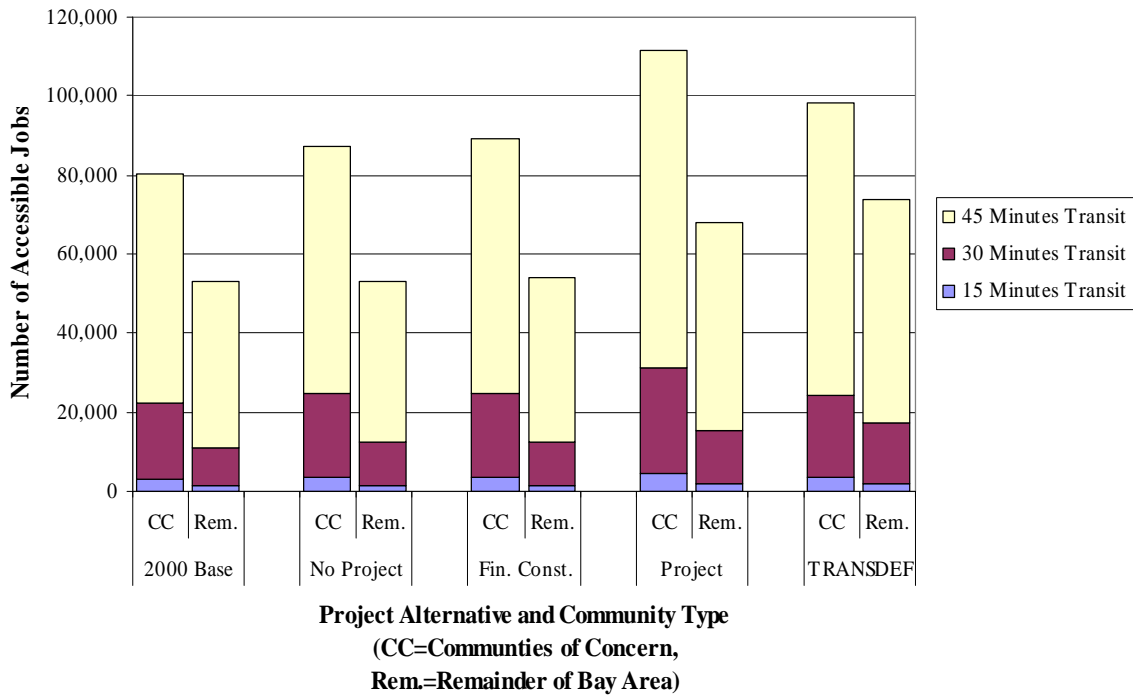
Communities with Suburban Densities

Turning to *Suburban* communities of concern, Figure 5 shows job access *by transit* for both suburban communities of concern and the remainder of Bay Area communities with suburban densities. Figure 6 depicts jobs access *by auto* for suburban communities of concern and the remainder of Bay Area communities with suburban densities.

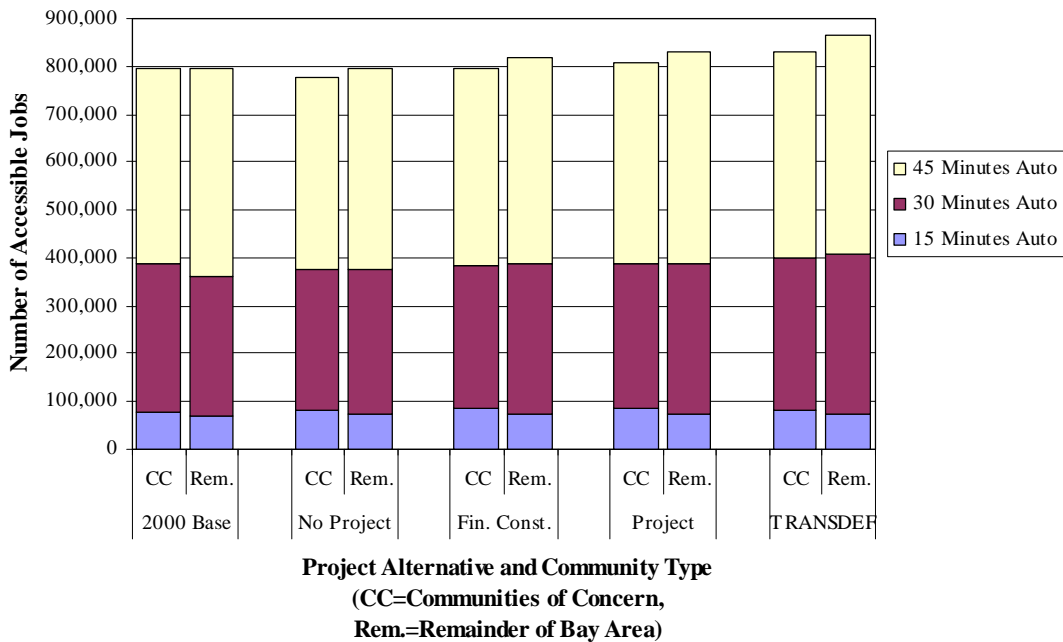
Suburban communities of concern have access to a significantly greater number of jobs *by transit* across all alternatives. The Project alternative offers suburban communities of concern access to the greatest number of jobs compared to the other alternatives, and is likely due to the investment in transit associated with this alternative as noted above.

As is the case with urban communities, access to jobs *by auto* is similar for both suburban communities of concern and the remainder of suburban communities across all alternatives, and does not increase significantly from the base year.

**Figure 5 TRANSIT Access to Jobs in Communities
with SUBURBAN Densities
by Project Alternative and Community Type**



**Figure 6 AUTO Access to Jobs in Communities
with SUBURBAN Densities
by Project Alternative and Community Type**



The following three maps provide some explanation as to why communities of concern with suburban densities may have access to a greater number of jobs – particularly by transit – than the remainder of communities with suburban densities.

The map entitled *Urban and Suburban Densities - Year 2000* illustrates the distribution of both suburban communities of concern and the remainder of suburban communities relative to all urban communities in the region. The map shows that communities of concern with suburban densities (red) are located closer to urbanized areas (brown) than the remainder of communities with suburban densities (yellow). Jobs, as well as other essential destinations, are often located in urbanized and developed areas along freeway or transit corridors. Transit service levels tend to be higher in developed areas as well. Therefore, suburban communities of concern that are closer in proximity to these urbanized areas would have access to a greater number of destinations, as well as transit service, than the more remote suburbanized areas.

Two additional maps illustrate the same distributions - suburban communities of concern and the remainder of suburban communities relative to all urban communities, but based on 2030 population projections. A separate map is included for the TRANSDEF alternative because of the different land use assumptions for the region than in the other alternatives, such as the emphasis placed on residential development into transit-supportive corridors, and projections that increase residential densities.

These two maps show similar concentrations to the 2000 map – suburban communities of concern remain close in proximity to urbanized areas compared to the remainder of suburban communities, and would therefore be closer to jobs and essential destinations as a result.

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Access to Low-income Jobs

A number of questions were raised during the equity analysis methodology discussions. While analysis can show accessibility to jobs, what kind of jobs are they? Are they jobs for which low-income Bay Area residents are qualified? Additional analysis was conducted to answer this question. Using 2000 Census data, jobs held by workers below 150% of the federal poverty level¹⁵ were identified. This data was then applied to the model (low-income jobs accessible within 30 minutes by auto and transit) and analyzed in detail for the 44 communities of concern.

Accessibility to low-income jobs within 30 minutes by transit is best from the downtown Oakland/Berkeley and downtown San Francisco communities of concern. Accessibility to low-income jobs by transit is lowest from some suburban and outlying areas. There is considerably greater access to low-income jobs by auto than by transit across all communities of concern.

The following three maps illustrate where low-income jobs are located in the Bay Area. The map entitled *Low-Income Jobs – Year 2000* illustrates that the largest concentrations of low-income jobs are located in or near communities of concern, and, in many cases, in the urbanized areas of the region. However, a significant number of low-income jobs are located along the I-680 corridor in Contra Costa County, and along the I-580 in Alameda County. Only one community of concern is located in either of these two areas – the Monument Boulevard Corridor in Concord. At a smaller scale, but with a similar pattern, there are low-income job areas located along the Highway 101 corridor in Marin and Sonoma counties that are not in close proximity to communities of concern.

Two additional maps illustrate the distribution of low-income jobs based on 2030 population and employment projections, and yield similar results to the Year 2000 map. A separate map is included to reflect the assumptions included in the TRANSDEF alternative as noted above on page 5-6.

Tables C10 and C11 in Appendix C contain results illustrating accessibility to low-income jobs for all 44 communities of concern.

¹⁵ Data used for this analysis (Census 2000 Transportation Planning Package (CTPP), Table 2-46) only shows the number of workers at work in an area by poverty status less than 150% and greater than 150% of the poverty level. Data is not available for 200% of the poverty level, which is used in the definition of communities of concern for the equity analysis.

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5.2 Access and Travel Time to Essential Destinations

This evaluation factor measured the number of essential destinations accessible by auto and transit for each of the Transportation 2030 alternatives for both communities of concern and the remainder of the Bay Area. Destinations accessible by both modes within 30 minutes are measured. It is important to note that while the forecasts include 2030 regional population projections, they are not able to project the location of essential destinations in the year 2030. The results below reflect access and travel time to the location of current-year destinations across the various transportation alternatives. The results are therefore likely to under-count the number of destinations that will be accessible in 2030 to accommodate the projected Bay Area population growth.

Results

As with access and travel time to jobs results, communities of concern generally have better access to all essential destination categories by auto and transit across all Transportation 2030 alternatives compared to the remainder of Bay Area communities. Again, this may be generally due to a greater concentration of destinations and higher levels of transit service available in urban and developed suburban areas where most communities of concern are located. Separating communities of concern with urban and suburban densities from the remainder of communities with urban and suburban densities yields mixed results. Figures 7-12 on pages 5-20 – 5-25 illustrate the results graphically, and are referenced in the text below.

Access to Schools (Figures 7– 9)

Elementary and Middle Schools (Figure 7)

Communities of concern with both urban and suburban densities have access to a greater number of elementary and middle schools by both transit and auto than the remainder of urban and suburban communities across all alternatives (Figure 7). In the case of access *by transit*, both urban and suburban communities of concern have considerably greater access than the remainder – approximately 15% more on average for urban communities of concern, and approximately 69% more on average for suburban communities of concern. However, it is important to note that the **number** of schools accessible to suburban communities (less than 10) is significantly lower than it is for urban communities (between 20-35).

In terms of access to elementary and middle schools *by auto*, both urban and suburban communities of concern have access to a greater number of schools than the remainder of urban and suburban communities as well. Both urban and suburban communities of concern are able to access between 3%-7% more schools than the remainder of urban and suburban communities. While the **number** of schools accessible by auto increase for both urban and suburban areas across all alternatives, the numbers remain higher for urban communities than suburban communities.

High Schools (Figure 8)

Access to high schools yields different results than accessibility to middle and elementary schools. The remainder of urban communities has access to a slightly greater number of high schools within 30 minutes *by transit* than urban communities of concern (except

under the Project alternative). Figure 8 depicts better access to high schools for suburban communities of concern than the remainder of suburban communities. However, due in part to the data limitations related to projecting the location of destinations in 2030, there is only one high school accessible by transit within 30 minutes for both suburban communities of concern and the remainder of suburban communities across the Transportation 2030 alternatives.

Looking at accessibility to high schools *by auto*, the reverse is true. Urban communities of concern have access to a greater number of high schools than the remainder of urban communities – in the 2%-7% range. Suburban communities of concern have access to fewer high schools, but only 1% to 3% fewer than the remainder of suburban communities.

Community Colleges and Universities (Figure 9)

Urban communities of concern have access to fewer colleges and universities *by transit* than the remainder of urban communities, between 2%-7% fewer. An exception occurs under the Project alternative where urban communities of concern have access to 3% more colleges and universities than the remainder of urban communities. Suburban communities of concern on the other hand, have access to a greater number of colleges and universities by transit within 30 minutes than the remainder of the suburban areas. However, suburban communities have access to fewer than 2 colleges and universities versus the 8-10 accessible in the urban areas.

By auto, the same is true. Urban communities of concern have access to fewer colleges and universities than the remainder of urban communities – but only by between 1%-3% across alternatives. In suburban areas, communities of concern have access to a greater number of colleges and universities – between 7%-12% more - than the remainder of suburban communities.

Access to Food Stores (Figure 10)

Both urban and suburban communities of concern have access to a greater number of food stores *by transit* within 30 minutes across all alternatives than the remainder of urban and suburban communities. The percent differences are greater for the suburbs (between 95%-160%) than the urban area (between 5%-14% more). The **number** of food stores accessible to suburban communities (approximately 20), however, is significantly lower than the number of food stores accessible within urban communities (approximately 100), making changes against that lower base much more dramatic in terms of percentage comparisons.

Accessibility to food stores *by auto* is very similar for both urban communities of concern and the remainder of urban areas, with communities of concern having access to just 1%-2% more food stores than the remainder of communities. In suburban communities, however, communities of concern have access to a greater number of food stores by approximately 19% (4% under the TRANSDEF alternative). Although a greater number of food stores is accessible by auto for both the urban and suburban areas, the **number** of stores remains higher in urban areas than in areas with suburban densities.

Access to Health Services (Figure 11)

Urban communities of concern have access to fewer health services *by transit* across all alternatives, including the base year, than the remainder of urban communities. Urban communities of concern have access to between 8%-17% fewer health services than the remainder of urban communities across alternatives. In suburban communities, the opposite is true. Communities of concern have access to a greater number of health services by transit across alternatives by between 29%-41% (1% under the TRANSDEF alternative). Once again, the **number** of health services suburban communities have access to across alternatives (just over 50) is significantly lower than the number of health services to which urban communities have access (more than 250).

By auto, urban communities of concern also have access to fewer health services across all alternatives, including the base year, than the remainder of urban communities. The percent differences range between 3%-7% across alternatives. The same is true in communities of concern with suburban densities – they have access to fewer health services than the remainder of suburban communities, by approximately 4%-6%. While access to the number of health services by auto for both urban and suburban communities of concern increases compared to the number accessible by transit, the total number of health services accessible within urban communities remains higher than in suburban communities.

Access to Social Services¹⁶ (Figure 12)

Under two of the four alternatives, urban communities of concern have access to a greater number of social services within 30 minutes *by transit* than the remainder of urban communities. Exceptions occur under the No Project alternative (1% fewer) and the TRANSDEF alternative (2% fewer than the remainder of urban communities). Suburban communities of concern have access to a greater number of social services across all alternatives than the remainder of suburban communities – on average in the 75% range across three of the four alternatives. Under the TRANSDEF alternative, suburban communities of concern have access to 31% more social services by transit than the remainder of suburban communities. The **number** of social services suburban communities have access to (under 100) is significantly lower than the number of social services to which urban communities have access (over 250).

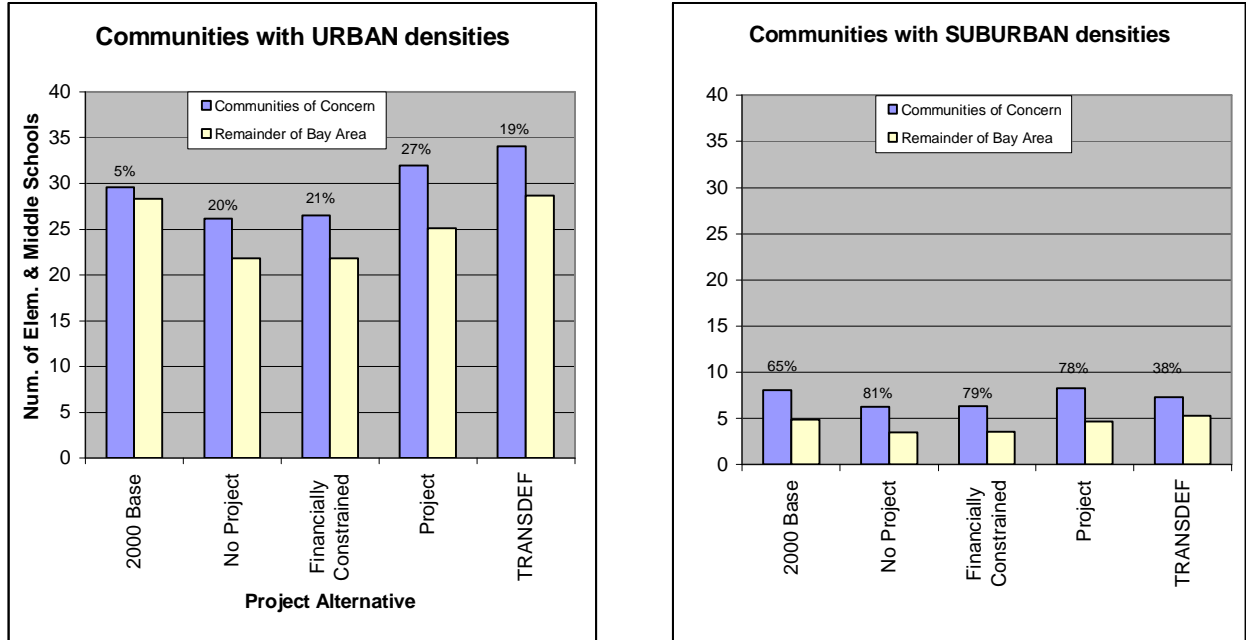
By auto, access to the number of social services increases for both urban and suburban communities compared to the number accessible by transit, but the number of services accessible within urban communities remains higher than in the suburbs. Urban communities of concern have access to a slightly greater number of social services than the remainder of urban communities, except under the TRANSDEF alternative. The same case is true for suburban communities of concern.

¹⁶ Post offices, banks and credit unions are included in the social service results discussed here, a suggestion made by MCAC. Results for these indicators are separated from social services in Appendix B, Tables B19 and B20, and Appendix D, Tables D19, D20, D27, D28, D39, D40, D47 and D48).

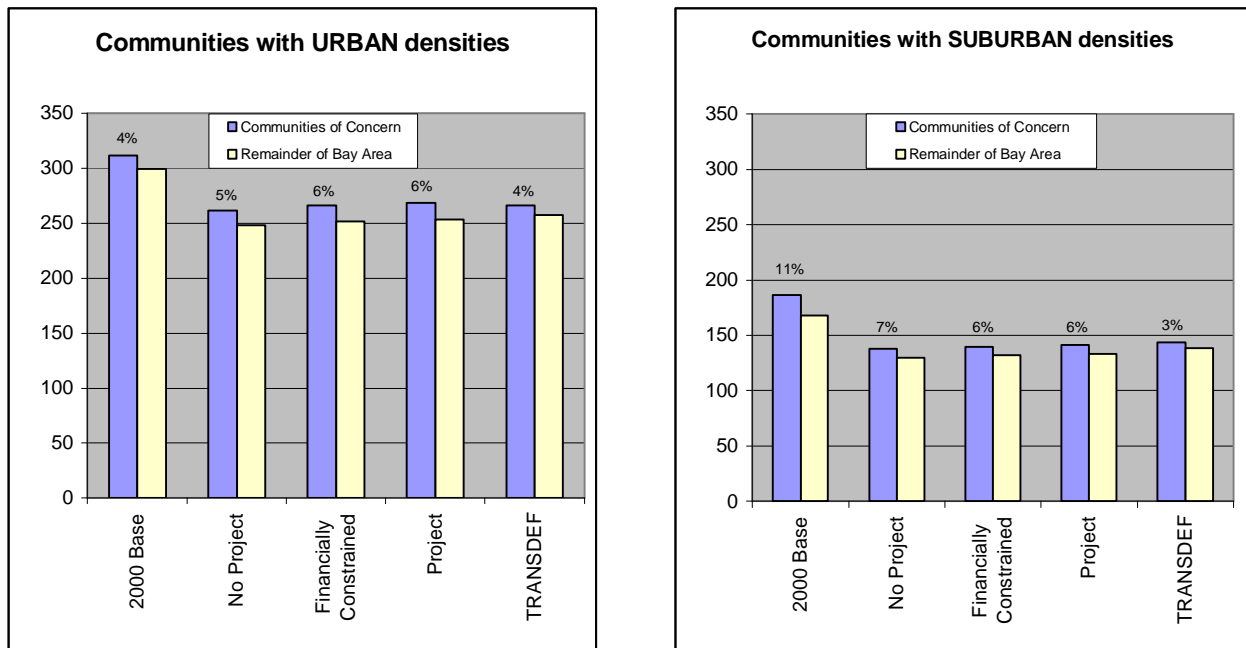
Again, the maps on page 5-8 through 5-10 provide some explanation as to why communities of concern with suburban densities may have access to a greater number of destinations than the remainder of communities with suburban densities – suburban communities of concern are located closer to urbanized or developed areas where essential destinations are often located compared to the remainder of suburban communities.

Figure 7
Access to ELEMENTARY AND MIDDLE SCHOOLS

TRANSIT: Number of Elementary & Middle Schools Accessible Within 30 Minutes by Transit



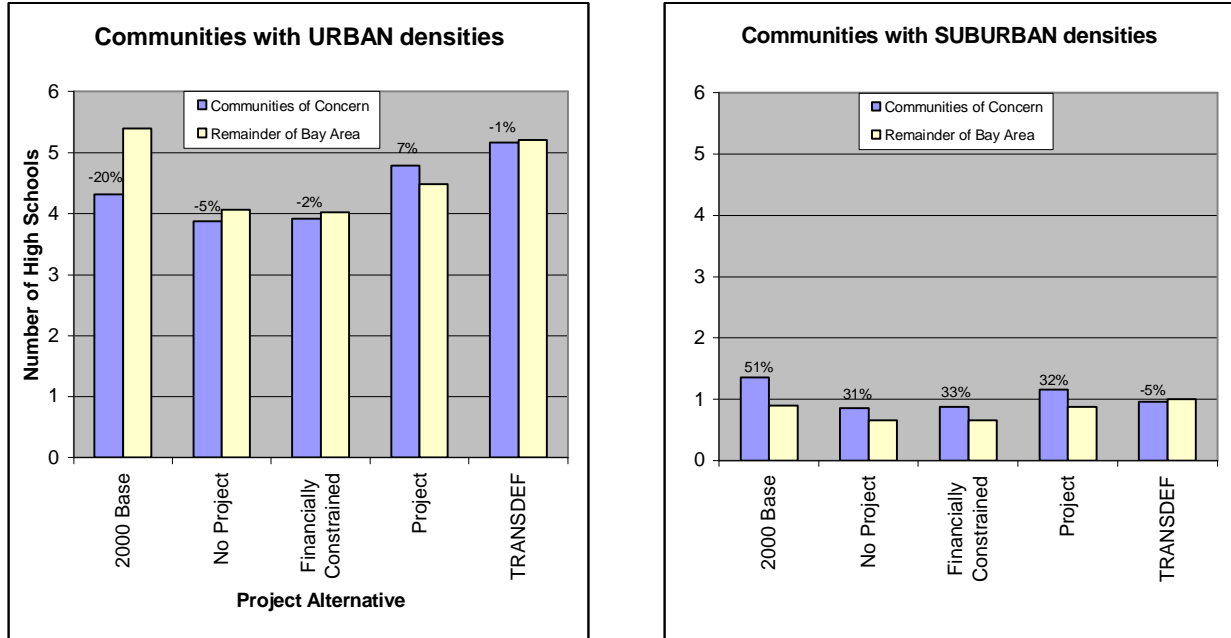
AUTO: Number of Elementary and Middle Schools Accessible Within 30 Minutes by Auto



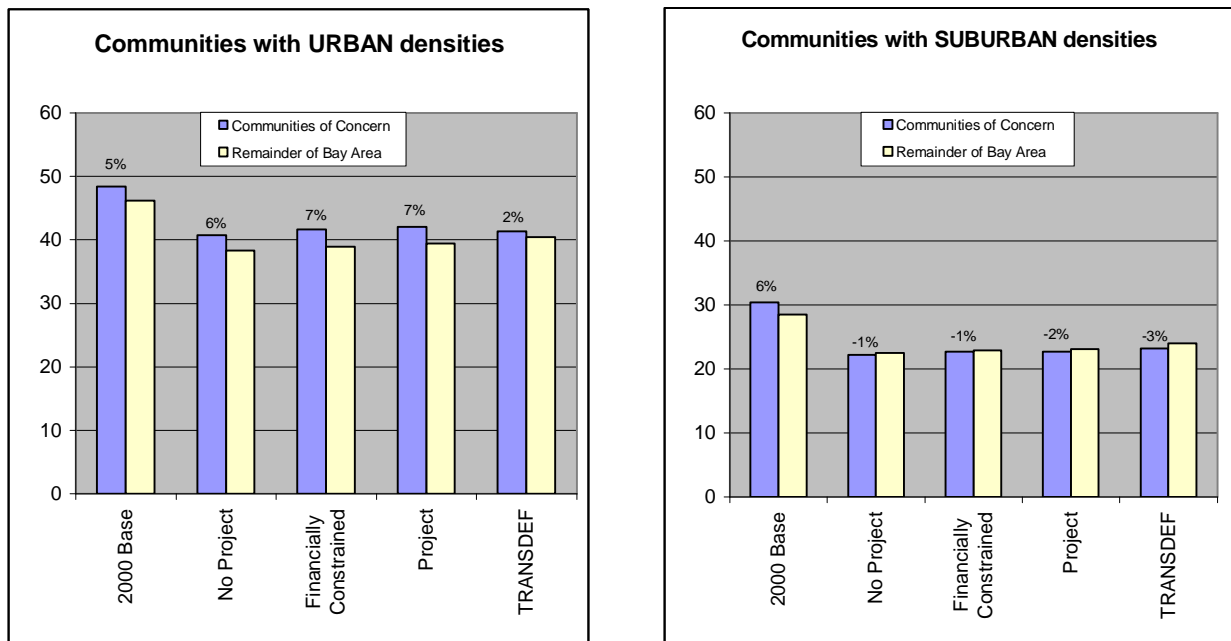
Note: Percentages above columns reflect the number of establishments Communities of Concern can access relative to the remainder of Bay Area communities. For example, a value of 5% implies that Communities of Concern have access to 5% more establishments than the remainder of communities. Similarly, a -5% implies that Communities of Concern have access to 5% fewer destinations than the remainder of Bay Area Communities.

Figure 8
Access to HIGH SCHOOLS

TRANSIT: Number of High Schools Accessible Within 30 Minutes by Transit



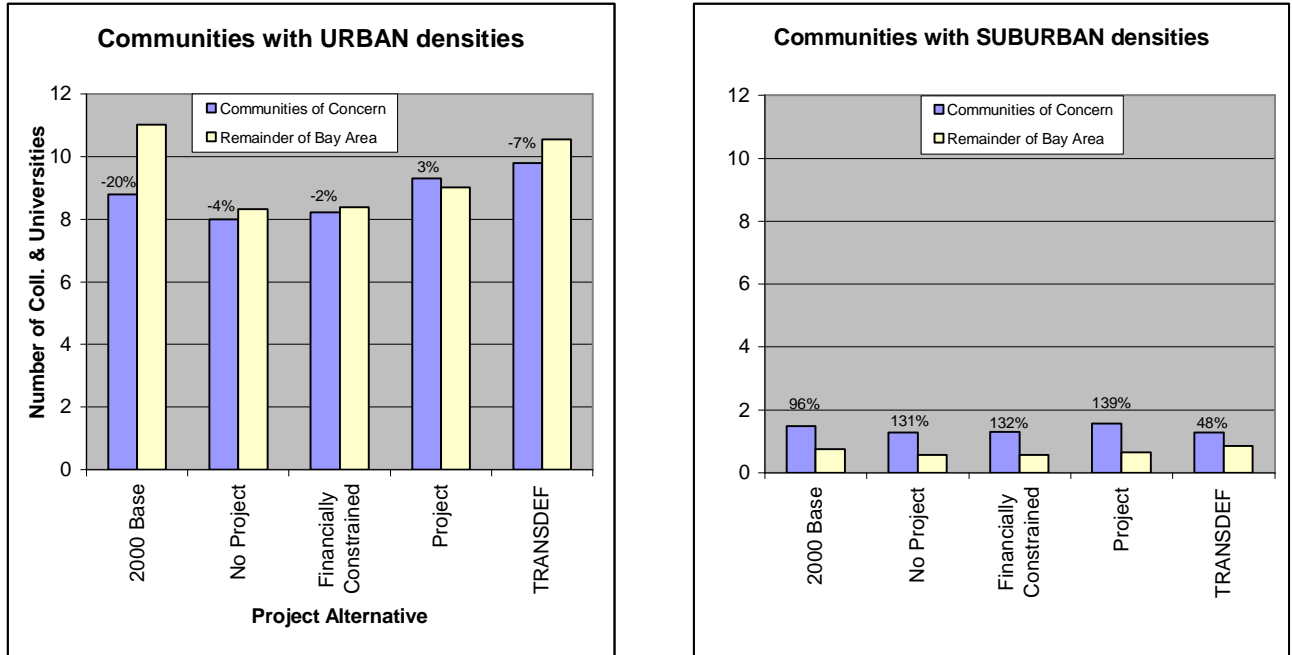
AUTO: Number of High Schools Accessible Within 30 Minutes by Auto



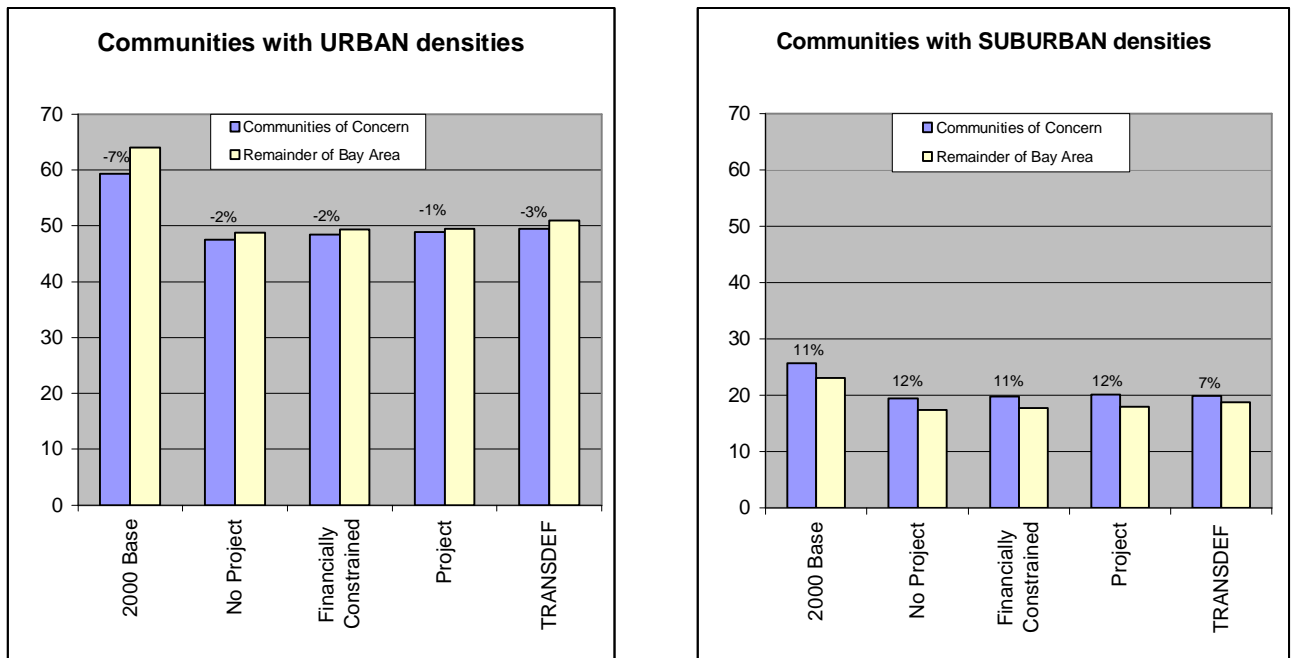
Note: Percentages above columns reflect the number of establishments Communities of Concern can access relative to the remainder of Bay Area communities. For example, a value of 5% implies that Communities of Concern have access to 5% more establishments than the remainder of communities. Similarly, a -5% implies that Communities of Concern have access to 5% fewer destinations than the remainder of Bay Area Communities.

Figure 9
Access to COLLEGES AND UNIVERSITIES

TRANSIT: Number of Colleges and Universities Accessible Within 30 Minutes by Transit



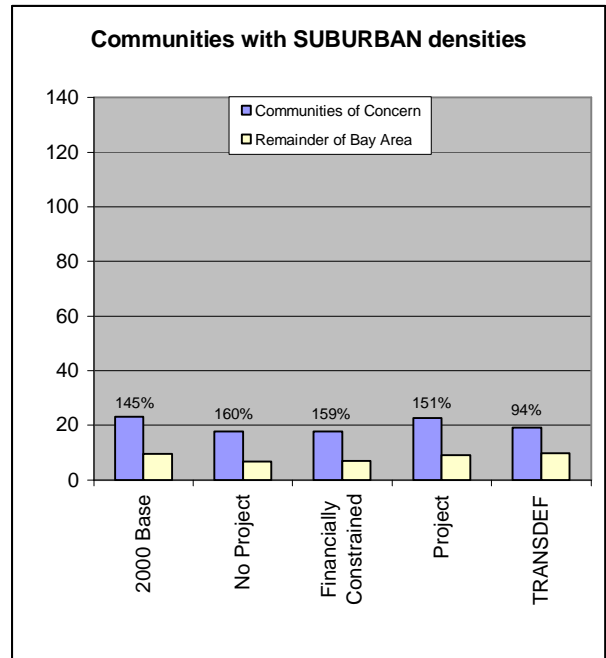
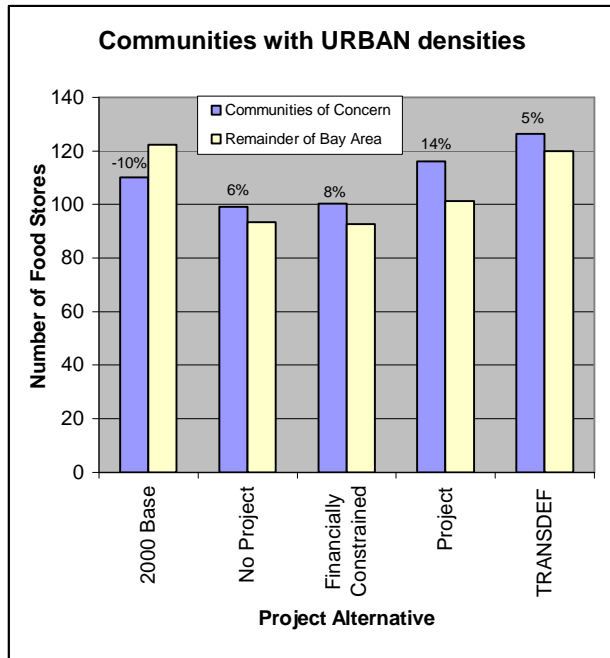
AUTO: Number of Colleges and Universities Accessible Within 30 Minutes by Auto



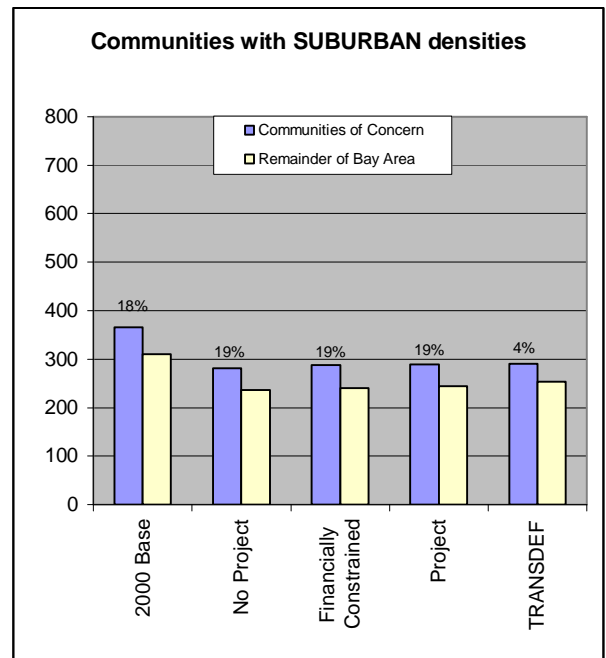
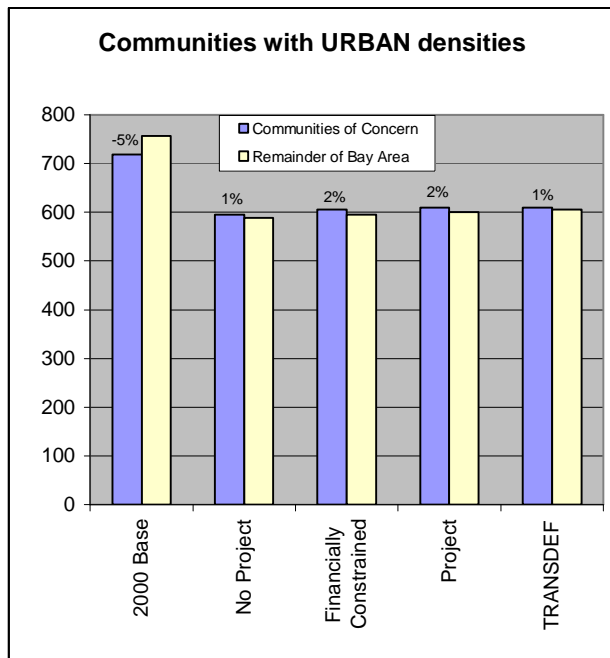
Note: Percentages above columns reflect the number of establishments Communities of Concern can access relative to the remainder of Bay Area communities. For example, a value of 5% implies that Communities of Concern have access to 5% more establishments than the remainder of communities. Similarly, a -5% implies that Communities of Concern have access to 5% fewer destinations than the remainder of Bay Area Communities.

Figure 10
Access to FOOD STORES

TRANSIT: Number of Food Stores Accessible Within 30 Minutes by Transit



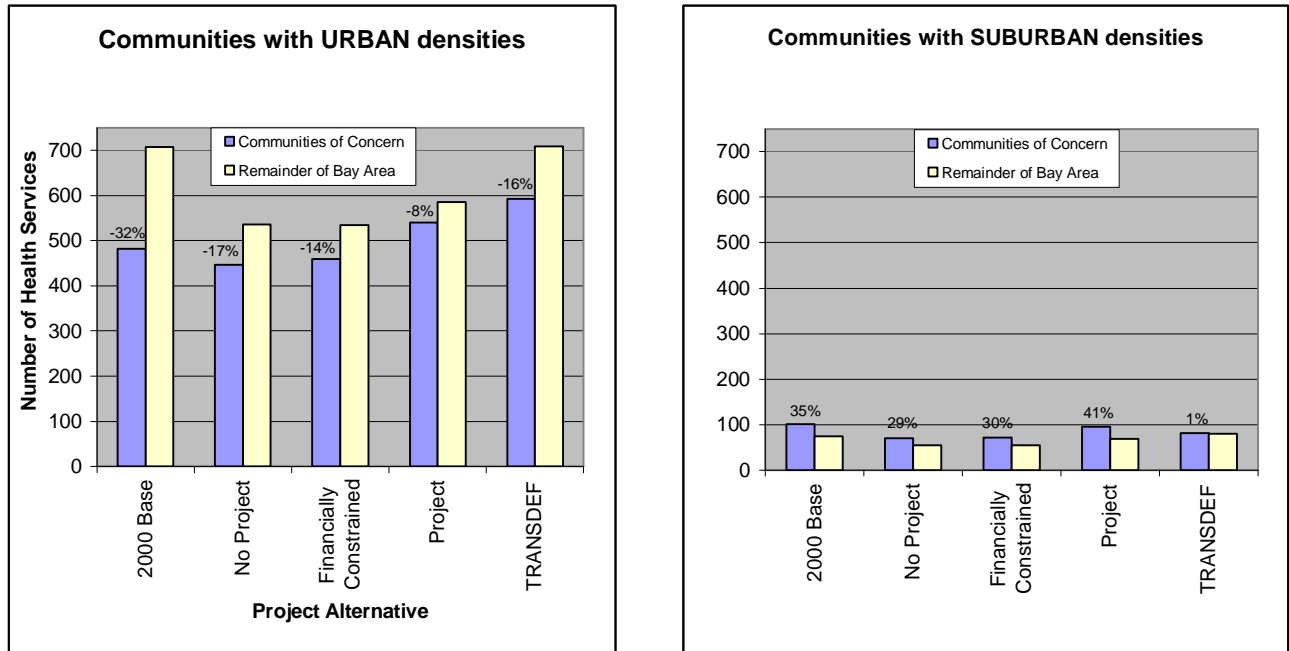
AUTO: Number of Food Stores Accessible Within 30 Minutes by Auto



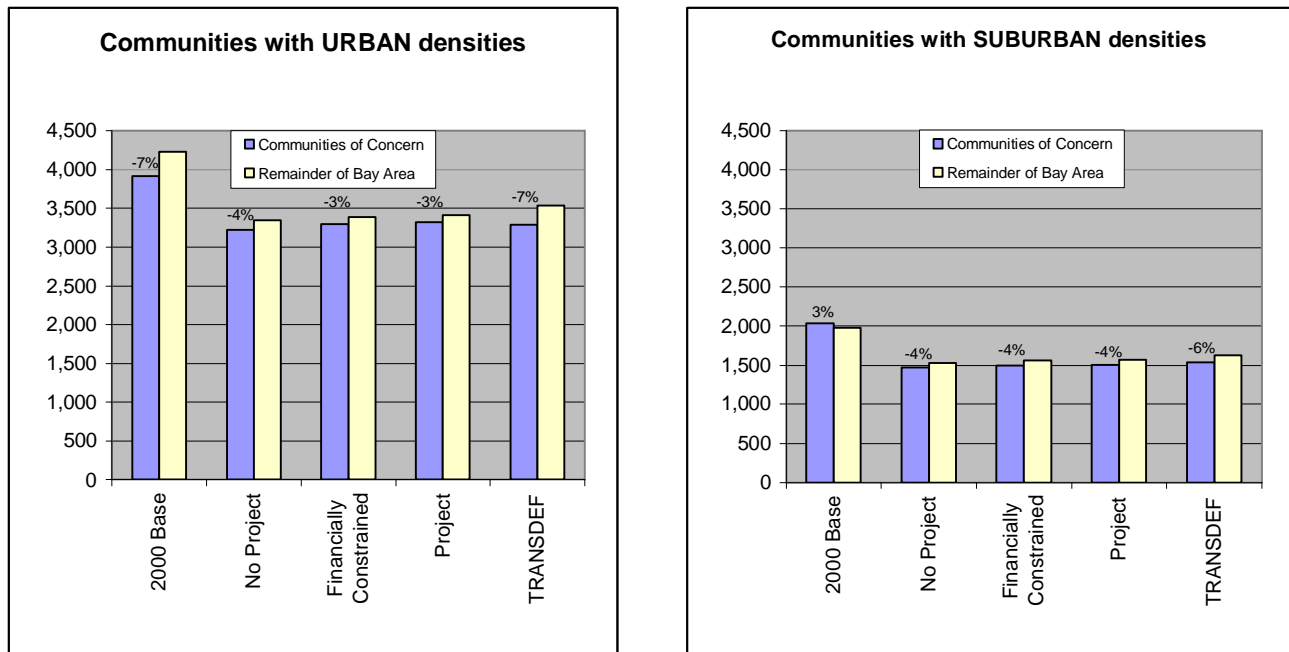
Note: Percentages above columns reflect the number of establishments Communities of Concern can access relative to the remainder of Bay Area communities. For example, a value of 5% implies that Communities of Concern have access to 5% more establishments than the remainder of communities. Similarly, a -5% implies that Communities of Concern have access to 5% fewer destinations than the remainder of Bay Area Communities.

Figure 11
Access to HEALTH SERVICES

TRANSIT: Number of Health Services Accessible Within 30 minutes by Transit



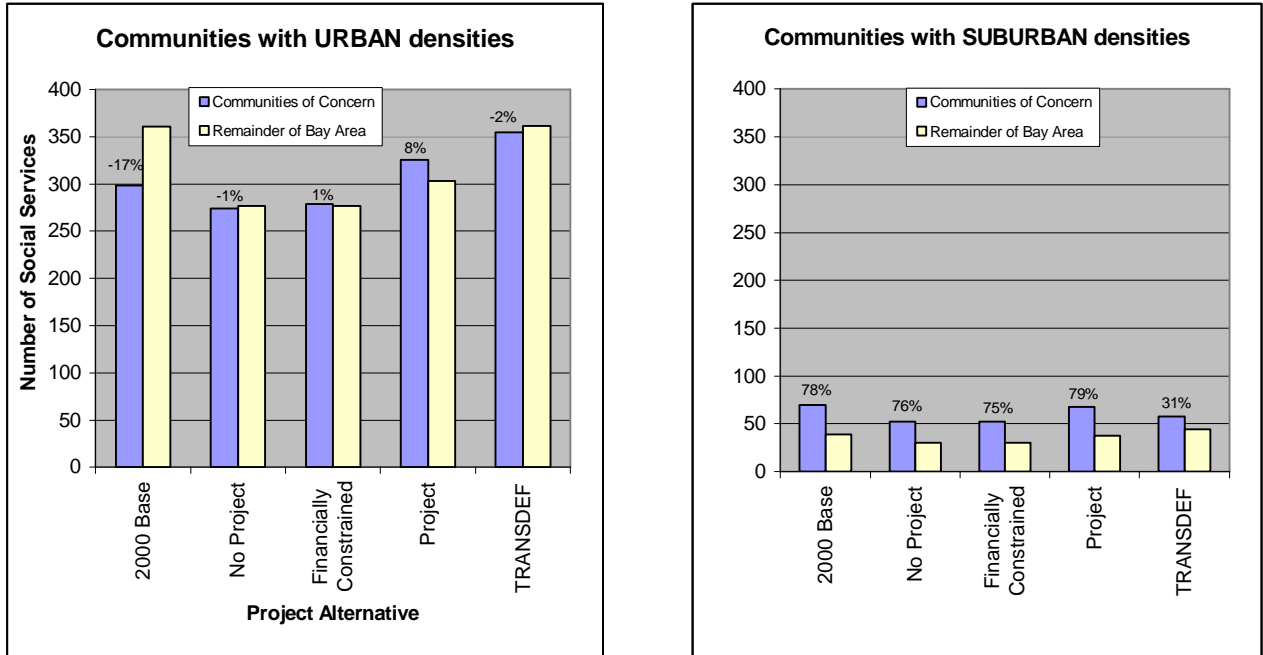
AUTO: Number of Health Services Accessible Within 30 minutes by Auto



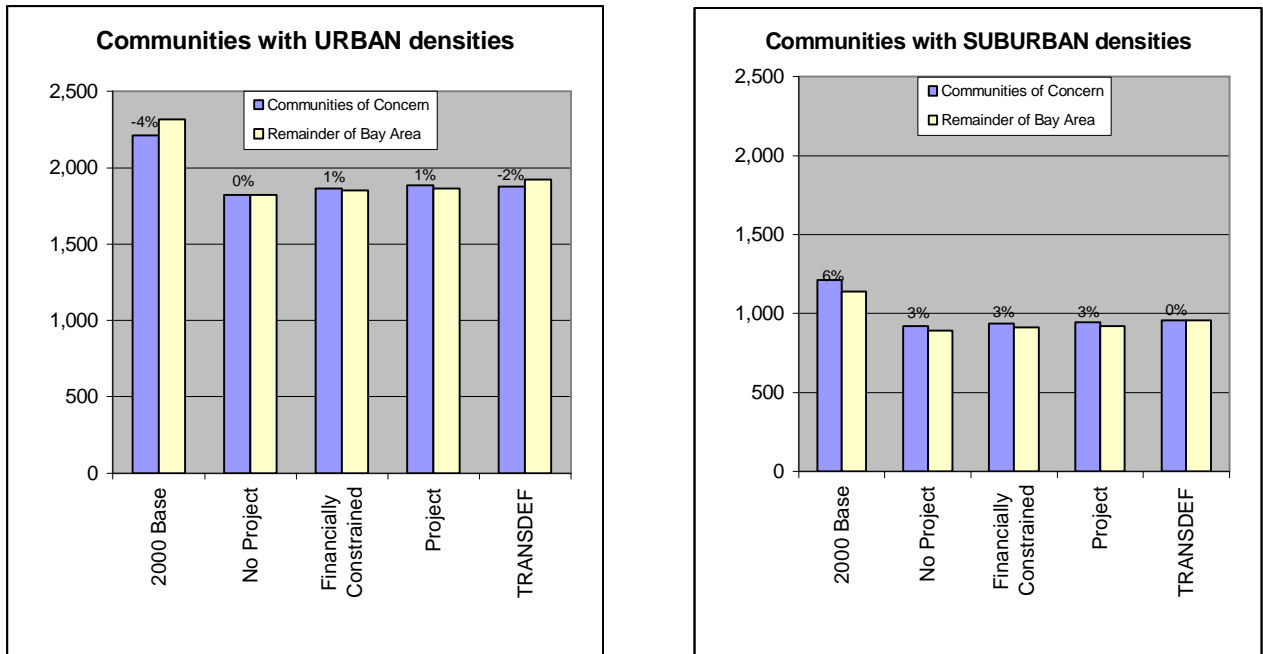
Note: Percentages above columns reflect the number of establishments Communities of Concern can access relative to the remainder of Bay Area communities. For example, a value of 5% implies that Communities of Concern have access to 5% more establishments than the remainder of communities. Similarly, a -5% implies that Communities of Concern have access to 5% fewer destinations than the remainder of Bay Area Communities.

Figure 12
Access to SOCIAL SERVICES

TRANSIT: Number of Social Services Accessible Within 30 minutes by Transit



AUTO: Number of Social Services Accessible Within 30 minutes by Auto



Note: Percentages above columns reflect the number of establishments Communities of Concern can access relative to the remainder of Bay Area communities. For example, a value of 5% implies that Communities of Concern have access to 5% more establishments than the remainder of communities. Similarly, a -5% implies that Communities of Concern have access to 5% fewer destinations than the remainder of Bay Area Communities.

5.3 Average and Aggregate Travel Time

These indicators provide summary statistics on predicted travel by trip purpose (work or non-work) and travel mode – driving alone, carpooling, taking transit, bicycling or walking.

Results – Mode Share

Work trips

Across the alternatives, approximately 60% of work trips made by residents of communities of concern are drive-alone trips. This compares to a 71% drive-alone mode share for the remainder of the Bay Area. Residents of communities of concern carpool approximately 3% more for work trips than the remainder of the Bay Area across the alternatives. Approximately 16%-19% of work trips made by residents of communities of concern are made on transit, which compares to a 11%-13% transit mode share for the remainder of the Bay Area. Figure 13 illustrates all mode splits for both communities of concern and the remainder of the Bay Area.

Non-work trips

Across all alternatives, approximately 78% of non-work trips made by residents of communities of concern are auto trips. This compares to an 85% auto mode share for the remainder of the Bay Area. On average, approximately 6% of non-work trips made by residents of communities of concern are made on transit across the alternatives. This compares to a 3% transit mode share for the remainder of the Bay Area. Residents of communities of concern walk for approximately 14% of their non-work trips across alternatives. This compares to a 10% walk mode share for the remainder of the Bay Area.

One reason that may partially account for the higher use of transit in communities of concern could be the significant investment in the maintenance and expansion of public transit service in all the “build” alternatives of the Transportation 2030 Plan.

Figure 14 illustrates all mode splits for non-work trips for both communities of concern and the remainder of the Bay Area.

Figure 13 Work Trip Mode Shares by Project Alternative and Community Type

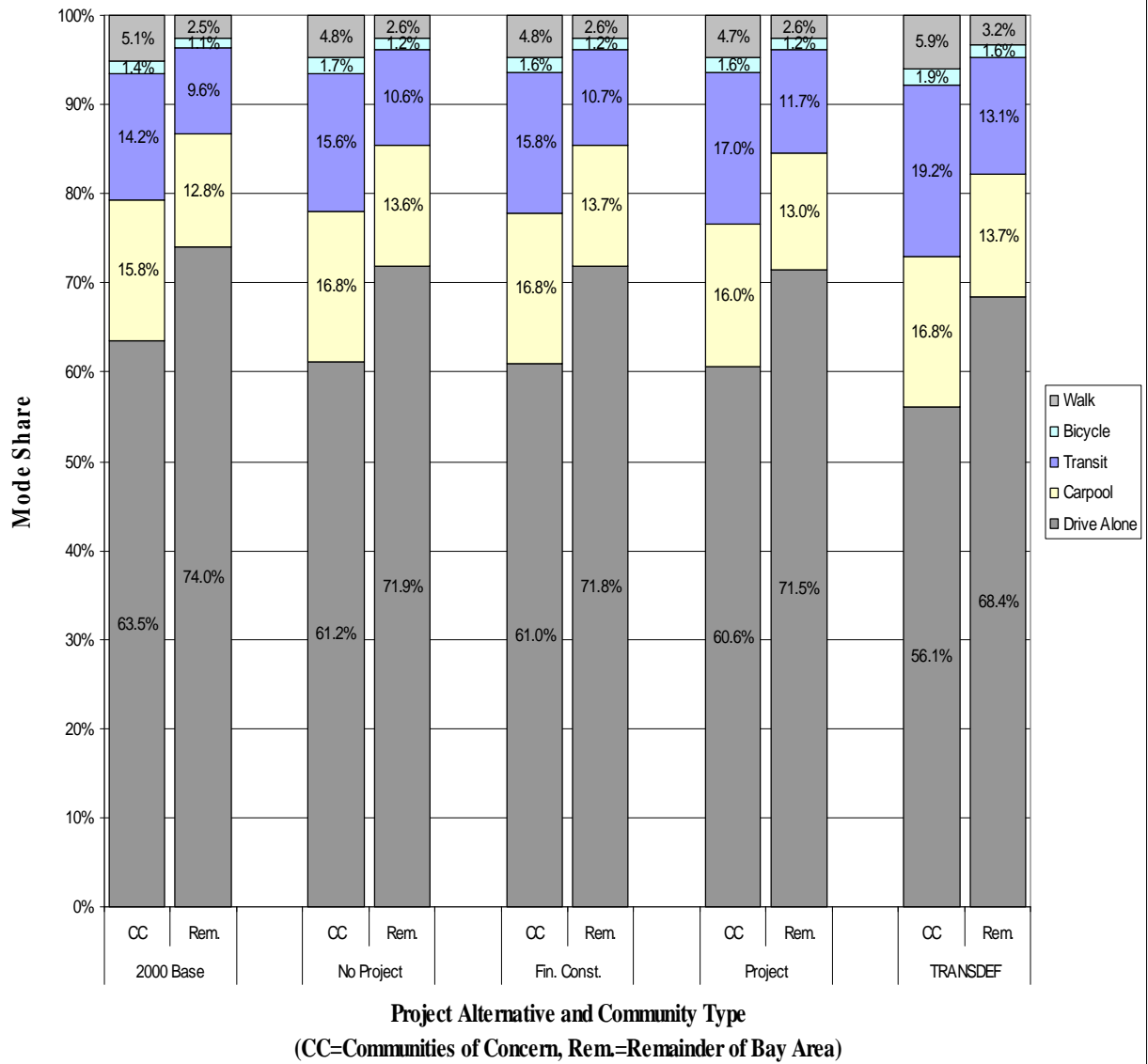
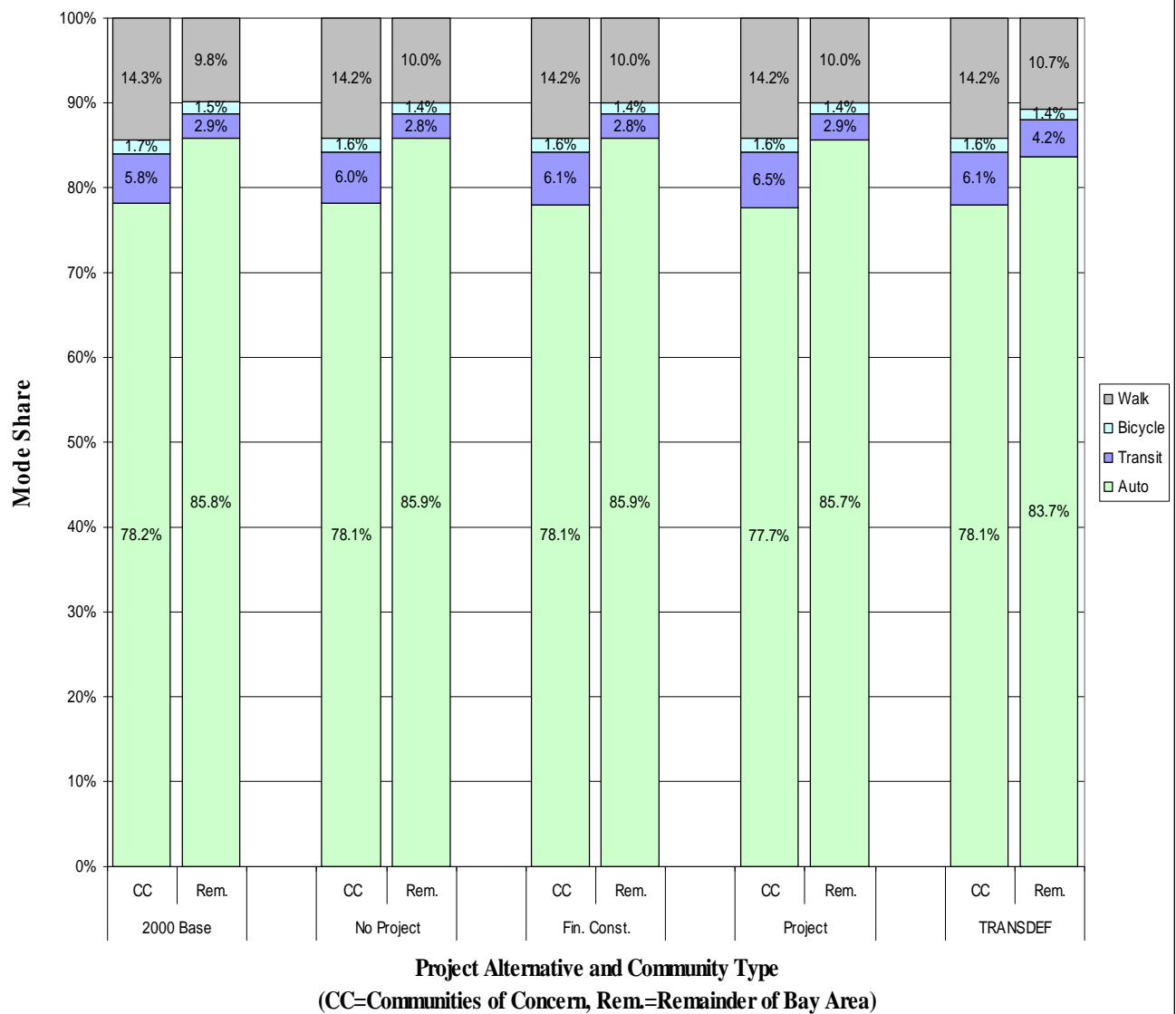


Figure 14 Non-Work Trip Mode Shares by Project Alternative and Community Type



Results - Average Travel Time

Results for this indicator, as illustrated in Tables 7 and 8, predict the average number of minutes per trip for work and non-work trips by all modes.

For *work trips*, average minutes per trip when driving alone do not vary significantly across the alternatives between communities of concern and the remainder of the Bay Area. Communities of concern average approximately 25 minutes per trip, while the remainder averages approximately 27 minutes. When taking transit, the average number of minutes per trip is approximately 45 for communities of concern, while the number of minutes per trip for the remainder of the Bay Area is approximately 55 minutes across the alternatives. Walking to work takes approximately 12-15 minutes for communities of concern, while walking trips to work range between 23 and 29 minutes per trip for the remainder of the Bay Area.

For *non-work trips*, residents of communities of concern average approximately 15 minutes by auto per trip. This compares to 16 minutes for the remainder of the Bay Area. Transit travel times for non-work trips for communities of concern and the remainder of the Bay Area do not vary significantly (2-3 minutes), nor do bicycling (1 minute) or walking times (no difference).

Table 7

Average Travel Time: Communities of Concern					
Mean Travel Time (average minutes per trip)	2000 Base	No Project	Financially Constrained	Project	TRANSDEF
Work Trips					
Drive Alone	23	26	26	26	25
Carpool	29	34	33	33	33
Transit	44	45	45	45	44
Bicycle	19	23	22	22	22
Walk	11	14	13	12	15
TOTAL, Work	26	30	29	29	30
Non-Work Trips					
Auto	15	15	15	15	15
Transit	33	32	32	31	31
Bicycle	21	21	21	21	20
Walk	12	11	11	11	11
TOTAL, Non-Work	16	16	16	16	16

Table 8

Average Travel Time -Remainder of Bay Area					
Mean Travel Time (average minutes per trip)	2000 Base	No Project	Financially Constrained	Project	TRANSDEF
Work Trips					
Drive Alone	26	28	28	27	27
Carpool	33	39	38	37	37
Transit	53	55	55	56	55
Bicycle	22	24	24	24	23
Walk	17	29	25	23	24
TOTAL, Work	29	33	32	32	33
Non-Work Trips					
Auto	16	16	16	16	16
Transit	35	33	34	34	33
Bicycle	22	22	22	22	21
Walk	12	11	11	11	11
TOTAL, Non-Work	16	16	16	16	16

5.4 User Benefits – Travel Time Savings and Out-of-Pocket Savings

The purpose of this indicator is to assess travel time savings and out-of-pocket costs associated with the Transportation 2030 alternatives compared to a No Project scenario. Essentially, benefits, in the form of dollar savings to users of the transportation system, are calculated for each alternative. These savings are compared to the “No Project” alternative, or the case in which the region does not invest in any of the transportation alternatives proposed in the plan.

“User benefits” refers to a consumer surplus that is calculated based on changes in travel time and out-of-pocket costs. Out-of-pocket costs include transit fares, auto operating costs, parking costs and tolls. Travel time savings is converted from hours of savings into dollar values using different values of time based on the type of trip. For example, auto trips are calculated with a different value than transit trips (see Appendix A, Section D, User Benefits for values of time).

Results

Time Savings

Table 9 shows the results for the user benefit indicator. Looking at communities of concern, in terms of travel time savings, all alternatives provide benefit (dollar savings) per capita per year compared to the No Project alternative, with the TRANSDEF alternative yielding the greatest travel time savings for both communities of concern and the remainder of the Bay Area.

Out of pocket savings

Out-of-pocket user benefits shows both positive and negative effects. Given all out-of-pocket costs, both the Financially Constrained and Project Alternatives provide communities of concern with an annual per capita savings when compared with the No Project alternative (\$4.82 and \$1.77 respectively). However, the out of pocket costs associated with the TRANSDEF alternative show a *negative value* per capita per year (-\$19.68) compared to the No Project alternative. This means that although users incur travel time savings as indicated above, their out-of-pocket costs (transit fares, auto operating costs, parking costs and tolls) under this alternative increase based on the pricing strategies associated with this alternative (auto costs likely outweigh transit cost reductions - see Section 4.2 Transportation 2030 Alternatives, pg. 4-4).

Total User Benefits

Total user benefits is calculated by adding travel time benefits to out-of-pocket costs. Of the three alternatives, the TRANSDEF alternative yields the highest total benefit for communities of concern, while the remainder of the Bay Area benefits most from both the Project and TRANSDEF alternatives, which are roughly equal. This may be due to the assumptions associated with each alternative, such as the pricing concepts that reward transit use and discourage road use included in the TRANSDEF alternative, which tend to benefit densely populated areas.

Table 9

User Benefits			
	Transportation 2030 Alternative		
	Financially Constrained	Project	TRANSDEF
Communities of Concern			
Travel Time User Benefits	\$68.17	\$153.20	\$229.94
Out-of-Pocket Cost User Benefits	\$4.82	\$1.77	-\$19.68
Total User Benefits	\$72.99	\$154.97	\$210.26
Remainder of Bay Area Communities			
Travel Time User Benefits	\$82.80	\$135.84	\$214.68
Out-of-Pocket Cost User Benefits	\$2.45	-\$0.17	-\$81.36
Total User Benefits	\$85.25	\$135.67	\$133.32
* User benefits are relative to the Transportation 2030 No-Project Alternative.			
* User benefits are annual per capita benefits in 2004 constant dollars.			

5.5 Vehicle Miles Traveled and Emissions

The purpose of these indicators is to summarize vehicle miles and mobile source (motor vehicle) emissions occurring within communities of concern, comparing the results to the remainder of the Bay Area.

The indicators used for the analysis are derived from the daily and AM peak period (6:30a.m. – 8:30 a.m.) MTC forecasts. Mobile source emissions are estimated using a California Air Resources Board emissions factor model.

The following indicators are used in the analysis:

- Daily Vehicle Miles of Travel (VMT)
- AM Peak Period Vehicle Miles of Travel (VMT)¹⁷
- AM Peak Period Vehicle Hours of Travel (VHT)
- AM Peak Period Vehicle Hours of Delay (VHD)
- Daily ROG (Reactive Organic Gases) Emissions (tons per day)
- Daily NO_x (Nitrogen Oxides) Emissions (tons per day)
- Daily CO (Carbon Monoxide) Emission (tons per day)
- Daily PM₁₀ (Particulate Matter) Emissions (tons per day)
- Daily PM_{2.5} (Particulate Matter) Emissions (tons per day)

The Transportation 2030 draft Environmental Impact Report (EIR), which is designed to provide information about the potential environmental impacts that could result from implementing any of the various alternatives included in the plan, includes a chapter on air quality where details are included about several of the emissions listed above. To provide background and context for the following results, excerpts from the EIR are included here that describe the emissions evaluated in the equity analysis.

Ozone

Ozone is a reactive pollutant, which is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_x). ROG and NO_x are known as precursor compounds of ozone. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of ROG and NO_x that help to form ozone. Ozone is a regional air pollutant because it is formed downwind of sources of ROG and NO_x under the influence of wind and sunlight. During summertime (particularly on hot, sunny days with little or no wind), ozone levels are at their highest levels.

Short-term exposure to elevated concentrations of ozone is linked to such health effects as eye irritation and breathing difficulties. Repeated exposure to ozone can make people more susceptible to respiratory infections, and aggravate preexisting respiratory diseases. Long-term exposures to ozone can cause more serious respiratory illnesses.

Carbon Monoxide

CO is an odorless and invisible gas. It is a non-reactive pollutant that is a product of incomplete combustion. Carbon monoxide is a localized pollutant, and the highest concentrations are found near the source. Ambient carbon monoxide concentrations generally follow the spatial and temporal distributions of vehicular traffic and are influenced by wind speed and atmospheric mixing. Carbon monoxide concentrations are highest in flat areas on still winter nights, when temperature inversion traps the carbon monoxide near the ground. When inhaled at high concentrations, carbon monoxide reduces the oxygen-carrying capacity of the blood, which, in turn, results in reduced

¹⁷ AM peak period hours of travel and hours of delay are more robust and reliable than daily estimates of these variables.

oxygen reaching parts of the body. Most of the Bay Area's carbon monoxide comes from on-road motor vehicles, although a substantial amount also comes from burning wood in fireplaces.

Particulate Matter

Particulate matter includes dirt, dust, soot, smoke and liquid droplets found in the air. Coarse particulate matter, or PM₁₀ which refers to particles less than or equal to 10 microns in diameter (about one-seventh the diameter of a human hair), is primarily composed of large particles such as dust from roads or black carbon (soot) from combustion sources. Fine particulate matter, or PM_{2.5} for particles less than or equal to 2.5 microns in diameter, contains particles formed in the air from primary gaseous emissions. Examples include sulfates formed from sulfur dioxide (SO₂) emissions from power plants and industrial facilities, nitrates formed from NO_x emissions from power plants, automobiles, and other combustion sources, and carbon formed from organic gas emissions from automobiles and industrial facilities. Coarse and fine particulate matter that are small enough to get into the lungs can cause numerous health problems, including respiratory conditions such as asthma and bronchitis, and heart and lung disease. People with heart or lung disease, the elderly, and children are at highest risk from exposure to particles.

The Bay Area experiences its highest particulate matter concentration in the winter, especially during evening and night hours. Major sources of PM₁₀ include wood smoke, combustion of fossil fuels, and airborne dust propelled in the air by motor vehicles and construction, and diesel exhaust from trucks and buses. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect.

For more detailed information about air quality assessments related to Transportation 2030, see Chapter 2.2 – Air Quality in the draft EIR.

Results

Two tables show the results for Vehicle Travel and Emissions. Table 10 displays total vehicle travel and emissions, and Table 11 shows results on a per capita basis.

Looking at total vehicle travel and emissions (Table 10), fewer vehicle miles are traveled in communities of concern than in the remainder of the Bay Area. Likewise, emissions are higher in the remainder of communities than in communities of concern. The geographic size of the remainder of the Bay Area is larger than the area making up the communities of concern, which may account for these results. More miles are likely to be driven in the larger geographic area than in the smaller area. However, regardless of vehicle miles, it is important to note that compared to the base year, except for PM_{2.5} and PM₁₀, emissions are significantly lower across all alternatives for both communities of concern and the remainder of the Bay Area. These reductions are based on the projected advances in technology related to emission control that will affect all vehicles over the next 25 years.

It should be noted that the Bay Area has been classified as attaining the federal health-based standards for carbon monoxide, ozone and PM₁₀ by the United States Environmental Protection Agency. The Bay Area is unclassified for fine particulate matter (PM_{2.5}) due to insufficient data, but preliminary data indicate that the Bay Area may be in attainment for this pollutant as well.

Table 11, which contains figures on a per capita basis to control for population, shows different results. Per capita, there are more vehicle miles traveled in communities of concern than the remainder of the Bay Area, resulting in slightly higher vehicle hours of travel and delay per capita for communities of concern. Emission indicators show similar results. Per capita, emissions are higher across all alternatives for communities of concern than for the remainder of the Bay Area, with percentage differences ranging from 11-12% in the TRANSDEF alternative to approximately 15%-23% across the other alternatives. As noted in the access and travel time to jobs and essential destinations sections previously, communities of concern are generally located in developed sections of both urban and suburban areas in close proximity to jobs and essential destinations. While residents of communities of concern benefit from close proximity to these jobs and essential destinations, they are also closer to the traffic volumes and emissions generated by the Bay Area population accessing these destinations as well.

Comparing emissions on a per capita basis across alternatives, each of the alternatives yields lower emissions than the No Project alternative for communities of concern.

Table 10

Vehicle Travel and Emissions					
	2000 Base	No Project	Financially Constrained	Project	TRANSDEF
Communities of Concern					
Daily Vehicle Miles of Travel (VMT)	50,576,095	75,238,794	73,485,093	73,963,864	72,897,013
AM Peak Vehicle Miles of Travel (VMT)	6,996,720	8,798,525	8,907,599	8,817,942	8,549,671
AM Peak Vehicle Hours of Travel (VHT)	218,476	324,600	325,839	296,331	308,299
AM Peak Vehicle Hours of Delay (VHD)	51,410	110,665	109,826	86,051	101,768
Daily ROG Emissions (tons per day)	22.0	2.5	2.3	2.3	2.3
Daily NOx Emissions (tons per day)	100.2	15.8	15.5	15.6	15.4
Daily CO Emissions (tons per day)	439.3	64.2	62.0	61.5	61.7
Daily PM ₁₀ Emissions (tons per day)	256.6	381.0	372.1	374.5	369.1
Daily PM _{2.5} Emissions (tons per day)	44.0	64.8	63.3	63.6	62.8
Remainder of Bay Area					
Daily Vehicle Miles of Travel (VMT)	79,121,165	112,995,459	114,506,120	112,118,657	110,019,263
AM Peak Vehicle Miles of Travel (VMT)	11,552,723	14,396,556	14,517,277	14,330,860	13,954,010
AM Peak Vehicle Hours of Travel (VHT)	346,099	525,448	512,864	469,140	485,179
AM Peak Vehicle Hours of Delay (VHD)	69,968	174,220	160,073	126,238	147,851
Daily ROG Emissions (tons per day)	35.1	3.8	3.7	3.5	3.6
Daily NOx Emissions (tons per day)	158.3	24.1	24.4	24.1	23.5
Daily CO Emissions (tons per day)	696.7	97.4	98.0	93.8	93.6
Daily PM ₁₀ Emissions (tons per day)	401.5	572.3	579.9	567.7	557.2
Daily PM _{2.5} Emissions (tons per day)	68.9	97.4	98.6	96.5	94.8
<i>Note: See Tables G2 - G10 for vehicle travel and emissions by the 44 Communities of Concern.</i>					

Table 11

Per Capita Vehicle Travel and Emissions					
	2000 Base	No Project	Financially Constrained	Project	TRANSDEF
Communities of Concern					
Daily Vehicle Miles of Travel (VMT/capita)	22.45	24.34	23.77	23.93	22.33
AM Peak Vehicle Miles of Travel (VMT/capita)	3.11	2.85	2.88	2.85	2.62
AM Peak Vehicle Hours of Travel (VHT/capita)	0.10	0.11	0.11	0.10	0.09
AM Peak Vehicle Hours of Delay (VHD/capita)	0.02	0.04	0.04	0.03	0.03
Daily ROG Emissions (grams/capita)	8.87	0.72	0.69	0.67	0.65
Daily NOx Emissions (grams/capita)	40.38	4.65	4.55	4.59	4.28
Daily CO Emissions (grams/capita)	177.03	18.87	18.20	18.07	17.15
Daily PM ₁₀ Emissions ((grams/capita)	103.43	111.92	109.30	110.01	102.67
Daily PM _{2.5} Emissions (grams/capita)	17.74	19.04	18.58	18.69	17.46
Remainder of Bay Area					
Daily Vehicle Miles of Travel (VMT/capita)	17.46	19.86	20.13	19.71	19.95
AM Peak Vehicle Miles of Travel (VMT/capita)	2.55	2.53	2.55	2.52	2.53
AM Peak Vehicle Hours of Travel (VHT/capita)	0.08	0.09	0.09	0.08	0.09
AM Peak Vehicle Hours of Delay (VHD/capita)	0.02	0.03	0.03	0.02	0.03
Daily ROG Emissions (grams/capita)	7.02	0.60	0.60	0.57	0.59
Daily NOx Emissions (grams/capita)	31.73	3.85	3.90	3.85	3.87
Daily CO Emissions (grams/capita)	139.63	15.55	15.63	14.97	15.41
Daily PM ₁₀ Emissions (grams/capita)	80.47	91.34	92.55	90.61	91.72
Daily PM _{2.5} Emissions (grams/capita)	13.81	15.54	15.74	15.40	15.60
<i>Note: See Tables G12 - G20 for per capita vehicle travel and emissions by the 44 Communities of Concern.</i>					

Chapter 6 : Summary and Conclusions

6.1 Access and Travel Time

At the aggregate level, when looking at access and travel time to jobs and essential destinations, communities of concern appear to share in the benefits of these transportation investments without bearing a disproportionate share of the burdens compared to the remainder of the Bay Area across the various Transportation 2030 alternatives.

However, since the majority of communities of concern are in urban areas, separating communities with urban densities from communities with suburban densities yields mixed results. In some cases, urban and suburban communities of concern have access to a greater number of destinations than the remainder of urban and suburban communities, such as food stores and elementary and middle schools. In other cases, the remainder communities have access to a larger number of destinations, particularly health services. In general, communities with suburban densities have access to fewer services and destinations than communities with urban densities.

For the most part, urban and suburban communities of concern have access to more jobs and essential destinations *by transit* than the remainder of the Bay Area. In cases where communities of concern have access to fewer destinations than the remainder of Bay Area communities, in many cases, the difference is less than 10%.

6.2 Average Travel Time and Mode Split

The remainder of Bay Area communities drives approximately 10% more for both work and non-work trips compared to communities of concern across the Transportation 2030 alternatives. Conversely, communities of concern take transit approximately 5%-7% more often for both work and non-work trips across all alternatives.

Travel time for work trips for communities of concern and the remainder of the Bay Area is very similar, varying by only a few minutes for auto travel and approximately ten minutes by transit. Walking trips to work vary by approximately 20 minutes.

Average travel times for non-work trips for communities of concern and the remainder of the Bay Area are very similar, varying by only a few minutes across all modes.

6.3 User Benefits

Communities of concern and the remainder of the Bay Area both benefit from building one of the Transportation 2030 alternatives than a “No Project” approach to transportation investment. From a user benefit standpoint, communities of concern benefit most from the TRANSDEF alternative, while the remainder of the Bay Area benefits nearly equally from both the Project and TRANSDEF alternatives.

6.4 Vehicle Miles Traveled and Emissions

On an aggregate level, more vehicle miles are traveled in the remainder of the Bay Area than in communities of concern across all alternatives. However, examining vehicle miles traveled on a per capita basis yields higher numbers in communities of concern

than in the remainder of the Bay Area by approximately 20% (only 12% higher in the TRANSDEF alternative).

Emissions measured on a per capita basis are higher for all indicators across all alternatives for communities of concern compared to the remainder of the Bay Area. The measurements are higher by approximately 15%-23% across the alternatives (only 11-12% in the TRANSDEF alternative). However, compared to the base year, except for particulate matter, all emissions are significantly lower in all cases due to projected advances in emissions technology in the 25-year period covered under the alternatives.

6.5 Conclusions

Collectively these results indicate that, overall, communities of concern will share equitably in the benefits of the Transportation 2030 investment alternatives without bearing a disproportionate share of the burdens. Results related to access and travel time to jobs and essential destinations varied depending on whether communities of concern with urban or suburban densities were under consideration.

The results suggest that, across the Transportation 2030 alternatives, transit will serve communities of concern better than the remainder of the Bay Area. What the analysis does not measure or capture is whether transit is serving residents *when they need to travel* and *where they need to go*, nor does it assess any cost barriers to using any particular mode of transportation. This is why obtaining input from residents of communities of concern, particularly those without access to vehicles, is so critical during the planning stages at the local level, such as through community-based transportation plans or short-range transit planning.

When examining transportation investments from a regional perspective, which was the focus of this analysis, it is difficult to key in on the needs of individual communities of concern. The tables in the Appendices of this report contain detailed results for each of the communities of concern for all of the indicators examined in the analysis. The results may yield additional information about communities of concern, such as the number of essential destinations located in each community, and may be useful for community transportation, land use or development planning efforts taking place in these communities.

Chapter 7 : Next Steps

MTC will continue to focus attention on improving transportation options in communities of concern. The following next steps are recommended.

1). Focus efforts on allocating the Lifeline Program's \$216 million on projects that improve transportation in communities of concern.

As a result of several MTC planning efforts including the community-based transportation plans and the county welfare-to-work transportation plans, innovative transportation projects have been proposed to address community-identified transportation barriers and gaps in low-income and minority communities. An emphasis should be placed on funding these projects. An expanded LIFT program to fund these projects should be pursued with the \$216 million allocated to the Lifeline Program.

2). Proceed with and complete remaining community-based transportation plans (CBTP).

While results of the equity analysis show that on an *aggregate level* communities of concern share in the benefits of the Transportation 2030 investment alternatives without bearing a disproportionate share of the burdens, transportation gaps in these communities continue to exist. While the equity analysis measured access and travel time to jobs and essential destinations, as mentioned above it does not measure when people need to travel or exactly where they need to go. These questions can be addressed at the local level through community-based transportation plans. The collaborative CBTP process is an effective way to both involve community residents in the transportation decision-making process and identify creative solutions to fill neighborhood transportation gaps.

The detailed tables containing results for each of the communities of concern found in the appendices can be used in the CBTP planning process to provide detail about existing conditions related to jobs and essential destinations in each community. For example, Table B13 in Appendix B shows that no food stores are located in Marin City. When community-based transportation planning occurs in Marin City, particular attention during the community involvement stage of the process can focus on asking community residents about their access to food stores and their ideas on improving it. Efforts to address this gap may, in this case, focus on land use and economic development solutions as well as those related to transportation.

3). Continue to develop land use and development policies that incorporate the transportation, housing and service needs of communities of concern.

Based on the food store example just noted, it is clear that land-use and development improvements can be made in low-income and minority communities throughout the Bay Area. To increase transportation and land-use investments in communities of concern, a link needs to be made between the development of jobs, essential destinations, affordable housing and transportation in transportation/land-use policies.

Both MTC's Transportation for Livable Communities and Housing Incentive Program have acknowledged the need to develop projects in low-income communities, and have identified the location of projects in these communities as an evaluation factor for project selection. Prior to the release of future calls for projects, the evaluation criteria can be reviewed and examined for ways to strengthen the evaluation criteria to encourage development in low-income communities.

Other programs and policies are under development, such as conditioning the allocation of regional discretionary transit funds under MTC's control (through MTC's Resolution 3434) on supportive land use policies for station areas and corridors included in the region's transit expansion program. Resolution 3434 provides over \$11 billion for nearly two-dozen transit expansion projects in both urban and suburban areas in the region. The projects will encompass a host of transit technologies (BART, light rail, ferry, commuter rail, streetcar and bus rapid transit) and will support a range of places (urban downtowns, suburban centers, residential neighborhoods, and park and ride stops)¹⁸. It will be important to 1) incorporate the transportation and land-use needs of communities of concern into this policy as it develops, and 2) ensure that residents of communities of concern participate in the planning and implementation phases of the projects so that the end results benefit community residents.

Efforts to influence transportation and land-use policy at the local level exist as well. Through regional funding, Congestion Management Agencies oversee the Transportation for Planning and Land Use Solutions Program, or T-PLUS, which facilitates the integration of transportation and land use planning. This is another opportunity for residents of communities of concern to get involved in the transportation /land use planning stages at the local level to affect change in their neighborhoods.

4). Continue to refine and improve upon the equity analysis methodology, and improve data collection on a region-wide basis.

As noted in Chapter 1, there is no standardized methodology for conducting a region-wide equity analysis. While the methodology for this equity analysis improved upon those completed in the past and included several new measures, other tools may be available to evaluate equity from a regional perspective. However, in order to proceed with a new methodology, data must be available to support it.

Evolving out of environmental justice and equity analysis discussions, MCAC developed a set of principles related to MTC and environmental justice that will be proposed to the Commission for review and consideration. Continuing discussions by MCAC may provide direction on the development of subsequent equity analysis methodologies.

Improving data collection on a region-wide basis is also a critical objective to achieve if additional types of analyses are to be pursued. For example, MTC can coordinate with Bay Area transit operators to identify ways to collect ridership data on a consistent basis

¹⁸ Preliminary Regional Policies and Incentives to Encourage Transit-Oriented Development. Metropolitan Transportation Commission. November 2004.

across the region. While most transit operators collect this information in some form, unless all operators collect the same data, comparisons across the region are not possible.

5). Pursue strategies related to Lifeline Transportation and Access to Mobility.

A key outcome of Transportation 2030 has been the adoption of an Access to Mobility goal, which recognizes the need to better understand and respond to transportation barriers faced by low-income persons, the elderly, persons with disabilities, youth, persons without cars, or other segments of society facing mobility limitations. MTC staff convened a Task Force to help develop specific recommendations. The Task Force recommendations included 1) clarifying that within the Access to Mobility goal, “Lifeline” should refer to the low-income populations to be consistent with how this term was applied in the 2001 Regional Transportation Plan and 2) the new investment of \$216 million should be dedicated to providing transportation improvements in low-income communities including low-income seniors and persons with disabilities.

Several calls to action are included in the draft Transportation 2030 Plan to carry out the Access to Mobility Goal. In addition to several of the items listed above (completing community-based transportation plans, linking land-use and transportation in low-income communities), the calls to action include: ensuring that strategies emerging from key regional and local planning efforts are included in local sales tax programs and other appropriate local planning/funding efforts; advocating for site-specific transportation services for low-income populations to be included in the design and funding of housing; and commercial development projects and advocating for increased federal funding to be distributed to states on a formula basis.

6). Continue to work towards improving the Bay Area’s Air Quality

MTC will continue to work with the Bay Area Air Quality Management District to develop new strategies to reduce regional emissions. The 2004 Ozone Strategy being developed by the Air District includes a number of stationary, mobile and transportation control measures that have quantifiable emission reduction benefits. MTC has invested over \$15 million to retrofit diesel bus exhaust systems that reduce ozone precursors and particulate matter.

Notwithstanding these improvements, the biggest impact on mobile source emissions will continue to be technological advancements with cleaner fuels and engines. As shown in the tables in Section 5.6, most emissions are expected to decrease substantially without any of the assumed transportation improvements in the Transportation 2030 Plan (No Project vs. other build alternatives). This decrease is primarily due to a much cleaner vehicle fleet assumed by the California Air Resources Board over the next 25 years.